BUREAU OF HYGIENE AND TROPICAL DISEASES.

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AMOEBIASIS AND DYSENTERY.

Amoebiasis.

Milam (Daniel Franklin) & Meleney (Henry E.). **Investigations of *Endamoeba histolytica* and Other Intestinal Protozoa in Tennessee: II. An Epidemiological Study of Amoebiasis in a Rural Community.**—*Amer. Jl. Hyg.* 1931. Sept. Vol. 14. No. 2. pp. 325–336. [2 refs.] [State Dept. of Public Health, & Dept. of Preventive Med. & Public Health, Vanderbilt Univ., Nashville, Tenn.]

An intensive study of a rural community in Jackson County, Tennessee, comprising 75 families and 374 individuals. This community, a pioneer type of social organization, had limited contact with the outside world, existed mainly on its own crops, and had no privy sanitation. 38 per cent. harboured cysts of *E. histolytica*, and other intestinal protozoa in proportionately high percentages. Clinical dysentery had occurred in about one-fourth of the population during the past ten years, but the attacks simulated bacillary rather than amoebic dysentery. No correlation was found between occurrence of dysentery and harbouring of *E. histolytica*. Other symptoms possibly referable to amoebiasis were found to be as common among non-carriers as among carriers of *E. histolytica*. The findings indicated that infection with *E. histolytica* did not warrant special public health measures to bring about its immediate reduction.

H. M. Hanschell.

Tao (S. M.). *Entamoeba histolytica* **Infection in North China. A Study of 1,000 Positive Cases.**—*Nat. Med. Jl. China.* 1931. Aug.–Oct. Vol. 17. No. 4/5. pp. 412–434. [50 refs.] [National Epidemic Prevention Bureau, Peking.]

A study of the incidence of *Entamoeba histolytica* infection in Peiping (Peking) in patients from N. China (temperate zone).

Among 36,483 examinations made on 9,533 hospital patients—average 3·8 examinations per caput—1,000 were found infected with *E. histolytica*, i.e., 10·49 per cent. positives. Sex and nationality had

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no influence on infection rate. Children under 4 years of age showed the lowest percentage of infection, which increased with age. A relationship between infection with *E. histolytica* and a definite age group above 5 years of age could not be established. More than half—i.e., 692 out of 1,000—were carriers, of which 449 (44·90 per cent.) were healthy carriers, and 243 (24·30 per cent.) were convalescent carriers. From the age of five upwards practically persons of all ages could act equally as carriers. 308 persons were found to show signs or symptoms of amoebiasis. No age group was singled out for susceptibility to the disease. There was no racial immunity. Only 4·30 per cent. showed symptoms of dysentery and 6 per cent. those of diarrhoea; but 17·40 per cent. showed mild symptoms of abdominal pain, discomfort, constipation. Included in this figure were 18 cases of amoebic abscess of liver, 2 cases of amoebic abscess of lung, and 11 cases of mixed infection with bacillary dysentery.

H. M. H.

Grubmann (M. S.). Ueber Amöbendysenterie in Baku. [**Amoebic Dysentery in Baku.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Aug. Vol. 35. No. 8. pp. 462–467. With 2 charts in text. [Hosp. for Acute Infectious Diseases, Baku.]

The disease is very common. Of 1,420 patients, the faeces of 149 (10·4 per cent.) showed vegetative and encysted forms of *E. histolytica*; and those of 107 (7·53 per cent.) encysted forms. The author is confident that these figures will prove to be higher still when the faeces of all patients are examined.

H. M. H.

i. Simic (Tshedomir). Présence de l'*Entamoeba dispar* Brumpt dans le sud de la Yougoslavie (Macédoine serbe). [*E. dispar* **in Southern Yugoslavia.**]—*Ann. Parasit. Humaine et Comparée.* 1931. July 1. Vol. 9. No. 4. pp. 289–302. [7 refs.] [Hyg. Inst., Skoplje, Yugoslavia.]

ii. ——. Infection expérimentale de l'homme par *Entamoeba dispar* Brumpt. [**Experimental Infection of Man with** *E. dispar.*]—*Ibid.* Sept. 1. No. 5. pp. 385–391. [5 refs.]

i. In this interesting paper the author records his extensive and careful observations and experiments. Each year he has noted sporadic cases of amoebic dysentery in Skoplje and neighbourhood; although amoebic dysentery is rare, more than 17 per cent. of the people are carriers of an amoeba with 4-nuclear cysts morphologically identical with those of *Entamoeba histolytica*. The author has studied this amoeba, in culture, from 12 different persons who had never had dysentery. Of these 12 strains, 7 were inoculated in 7 series into 42 young cats—6 cats for each series. None of the cats was over 600 grams in weight and in all the anus was closed for 48 hours. They were inoculated either directly with human faeces containing cysts and vegetative forms, or with cultures. Only two cats were infected; one in the second series and the other in the 5th series and in both cases with cultures. The amoebae in stools of the infected cats, as well as with their cultures, failed to infect three other cats. The two strains with which the two cats were infected, were also injected into the rectum of 4 human volunteers; they were not infected with the

amoeba but did become infected with the *E. coli*, *Endolimax nana* and *Trichomonas intestinalis* injected at the same time.

The author concludes that this non-pathogenic amoeba infesting 17 per cent. of inhabitants of Skoplje can be none other than the *Entamoeba dispar* of Brumpt (1925), and that *E. dispar* is not a normal inhabitant of the human rectum [see this *Bulletin*, Vol. 23, p. 35].

ii. The author has succeeded in infecting 6 human beings with this "*E. dispar*," and despite frequent purgations, fatigues and changes in diet, imposed on the experimentally infected subjects, no illness resulted. The amoeba did not become pathogenic. At each passage in man the amoeba was inoculated into kittens; no kitten became infected.

H. M. H.

KHOURI (J.). L'amibiase extra-intestinale. [**Extra-intestinal Amoebiasis.**]—*Rev. Prat. Malad. des Pays Chauds.* 1931. July. Year 10. Vol. 11. No. 7. pp. 329–330.

Dr. Khouri once more records that his five years unremitting search for the dysentery amoeba in urine and sputa has failed to reveal any case of amoebic bronchitis, nephritis or cystitis, in Alexandria, where others have so often reported it that Alexandria should be the world's focus of extra-intestinal amoebiasis. [But then Dr. Khouri has shown that he not only knows amoebae but is also acquainted with, and in fact practises, that technique which alone can surely demonstrate them.]

H. M. H.

GRASSO (Rosario). Sul problema dei portatori di "Entamoeba histolytica." [**Carriers of** *Entamoeba histolytica.*]—*Policlinico.* Sez. Prat. 1931. Sept. 28. Vol. 38. No. 39. pp. 1425–1429. [1 ref.] [Inst. of Clin. Med., Univ., Catania.]

The author examined the fresh faeces of 60 patients to whom had been given a purgative dose of sodium sulphate, with a view to determining the numbers harbouring *E. histolytica*. He selected those who presented no signs of any intestinal disease. Four were found to be cyst-passers and 17 others passed vegetative forms, making 21 in all or 35 per cent. He also examined the faeces of the daughter and 3 sons of a patient with amoebic hepatitis and found all the sons to be carriers; of two children of a patient with acute amoebic dysentery, one was positive, and of the 4 children, a daughter and 3 sons, of one of the 60 above mentioned who proved to be excreting the vegetative form, the daughter and one son were positive. The hospital draws its clinical material from the lowest social classes among whom hygiene is conspicuously defective. [Stress is laid in the article more than once on the fact that 10 of the positive cases were suffering from abscess of the lungs, but no valid deduction can be drawn from this seeing that 23 of the 60 patients selected were suffering from pulmonary or pleural affections.] See also this *Bulletin*, Vol. 9, p. 404; Vol. 11, p. 49 and Vol. 18. p. 175.

H. H. S.

i. FAUST (Ernest Carroll). **The Diagnosis of *Endamoeba histolytica*.**—*Nineteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1930. pp. 61–64. [12 refs.] [Dept. of Trop. Med., Univ. of Louisiana, New Orleans.]

ii. O'CONNOR (F. W.). **The Treatment of Amoebiasis with Anayodin.**—*Ibid.* pp. 64–67. [Presbyterian Hosp., Columbia Univ., New York.]

iii. THONNARD-NEUMANN (Ernst) & VALERA (Francisco). **Treatment of Amoebiasis with Preparations of Iodo-Oxy-Quinolin Sulphonic Acid.**—*Ibid.* pp. 68–76. [United Fruit Co. Hosp., Santa Marta, Colombia.]

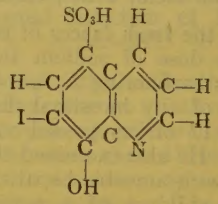
v. BREWSTER (K. C.). **Increase of Amoebiasis during the Rainy Season in Puerto Cortez, Honduras.**—*Ibid.* pp. 77–79. [Cortez Development Co. Hosp., Puerto Cortez, Honduras.]

v. FLETCHER (L. R.). **Amebic Dysentery with Liver Abscess—Case Reports. (Treatment of Abscess by Aspiration.)**—*Ibid.* pp. 80–81. [Truxillo Railroad Co. Hosp., Puerto Castilla, Honduras.]

i. The author briefly recounts his extensive experience in microscopical examination of faeces and declares that three examinations, made by a careful worker, capable of recognizing the differential characteristics of *E. histolytica*, may, with a certain technique, determine with reasonable sureness the presence or absence of *E. histolytica*.

The technique is :—(1) As fresh faecal material as can be obtained—sometimes best obtained by proctoscope ; (2) Small portion of faecal material thoroughly mixed with drop or two of physiological salt solution on oil free clean slide ; (3) Smear should be 25 mm. wide and 50 mm. long ; (4) Clean 22 mm. cover slide is placed on right hand half of film ; (5) Small drop of Donaldson's iodine (saturated solution of iodine in 5 per cent. aqueous KI) is then added to left hand portion and thoroughly mixed, and this portion of film is covered with a cover slide.

ii. Ernst Bischoff, its manufacturer, gives the formula of anayodin as Iodoxyquinolin sulphonic acid with the addition of 22 per cent. sodium bicarbonate : empiric formula $C_9H_6INSO_4$.



Each 4 grain anayodin pill contains $3\frac{1}{10}$ grains iodoxyquinolin sulphonic acid and $\frac{1}{10}$ grain of sodium bicarbonate. The sod. bicarb. is added to increase solubility, not for any therapeutic action.

Iodoxyquinolin sulphonic acid contains 28 per cent. iodine, so in each pill there is 0·896 or practically $\frac{1}{10}$ grain of iodine. This iodine is so firmly fixed that no trace of free iodine can be found in anayodin pills, powder, or solution. The pills are enteric coated to protect them from gastric fluids and permit them to enter the small intestine unchanged. In the present series 51 cases have been studied. Four anayodin pills were given with meals, thrice daily, for eight days. One case complicated by bacillary dysentery (Flexner Y type), admitted to

hospital in prostrate condition, died. One patient relapsed after anayodin treatment, but recovered completely after a second treatment with anayodin. 49 patients treated with anayodin were observed for 6 months to two years, during which time no free or encysted amoeba was found in the stools. Amoebic abscess of liver appears to be unaffected by anayodin given orally; the drug probably exercises direct action on parasites in gut only. Administration of the drug is attended by no unpleasant symptoms.

iii. The authors record their experience in treating 25 cases of amoebiasis with anayodin and 30 cases with yatren. Details of each series are carefully and clearly set out in tabular form. The authors found that in chronic amoebiasis and chronic amoebic dysentery, iodoxyquinolin sulphonic acid (yatren 105, and anayodin) possess advantage over other forms of treatment. Prompt disappearance of vegetative, precystic, and cystic forms of *E. histolytica* is soon followed by relief of gastro-intestinal symptoms. Blood, pus, mucus, if present, quickly vanished, as did tenesmus and colic. Diarrhoeic stools soon became soft and later firm. Many patients previously constipated emphasized the fact that even after cessation of treatment normal regular evacuations continued. No toxic symptoms were noted even after prolonged use of the drug. No severe restriction of diet was necessary, and only exceptionally were more than 9 pills daily required. Patients were freed from their infection, safely, in a short time, and without much personal discomfort or loss of working days.

iv. A community of 6,000 people showed a rate of infection of 25 per cent., in hospital and dispensary cases, at end of dry season. Drinking water was only rarely boiled. Raw vegetables and raw milk were consumed. Sanitary conditions were very primitive. Rainfall increased from 5·26 inches per month (September) to 18·67 inches average per month during October to January inclusive. The rate of amoebic infection increased with rainfall, reaching a peak of 69·45 per cent. of all specimens examined during December, and dropped to dry season rate in the first half of February.

v. Two cases; in each, besides aspiration, bismuth subnitrate was given by mouth and emetine hydrochlor. hypodermically. Both made good recoveries.

H. M. H.

CHEN (S. M.), VAN GORDER (G. W.) & YUAN (Y. K.). **Amoebic Abscess of the Liver. A Study of Forty-Eight Cases with Particular Attention to Treatment.**—*Nat. Med. Jl. China.* 1931. Aug.–Oct. Vol. 17. No. 4/5. pp. 393–411. With 6 figs. (5 on 4 plates). [21 refs.] [Peiping Union Med. College, Peking.]

Full clinical records and careful study of the cases. Five were foreigners and 43 Chinese. The average age was 35·5 years. The youngest was 17 years old and the oldest 65. Four per cent. of cases occurred in females. Pus aspirated from thirty three out of forty cases in which cultures were made yielded no pyogenic organisms. Pus aspirated from twenty-six out of forty cases in which search was made contained motile *Entamoeba histolytica.* Seventy-one per cent. of the cases gave definite history of dysentery at some time in the past. Fever and sweats with pain in liver region and bulging mass in right hypochondrium occurred in the majority of cases. In all except one

the abscess was in right lobe of liver. The total mortality of the series was 20·8 per cent. ; 32 per cent. for cases operated on and 9·9 per cent. for the non-operated. Aspiration with administration of emetine had proved the method of choice. Use of yatren should receive further consideration.

H. M. H.

ENGMAN (Martin F.) Jr. & MELENEY (Henry E.). **Amebiasis cutis (*Endameba histolytica*). Report of Two Cases.**—*Arch. Dermat. & Syph.* 1931. July. Vol. 24. No. 1. pp. 1–21. With 28 figs. (9 coloured on 1 plate). [11 refs.] [Med. School, Washington Univ., St. Louis, & Med. School, Vanderbilt Univ., Nashville, Tenn.]

A careful and well illustrated study of two cases in which ulcers involving the skin and deeper tissue of the abdominal wall were found to contain amoebae having the morphological characteristics of *E. histolytica.* One was secondary to an operation for resection of a portion of the colon involved in an amoebic ulceration. The other followed drainage of an amoebic abscess of the liver.

In Case 1 typical *E. histolytica* were found in smears and sections from biopsy of an ulcer of the skin. The resected colon showed an ulcerative process, typical of amoebiasis, but characteristic amoebae were not absolutely demonstrable in the sections.

In Case 2 typical *E. histolytica* were found in sections from biopsy of an ulcer of the skin and in autopsy sections from the floor of the ulcer, from the subcutaneous fat, from muscle tissue of the abdominal wall, from the abscess of the liver and from small ulcers in the colon.

Clinically the amoebic ulcers of the skin showed a rapidly spreading ulcerative process, activity of which varied in different parts of the margin ; a border presenting an irregular outline as the result of varying rapidity of ulcer progress ; an overhanging ledge of dying epidermis from under which pus could be expressed ; an advancing halo beyond ulcer margin which varied in colour from dusky red till it merged into the colour of normal skin ; extreme pain on pressure ; floor of ulcer composed of indolent granulation tissue covered irregularly with débris and pus.

H. M. H.

MARWITS (E. L.) & VAN STEENIS (P. B.). **A Case of Amebiasis Cutis after Incision of a Pericecal Abscess. (Phagédénisme cutané amibien.)**—Reprinted from *Urol. & Cutaneous Rev.* 1931. Vol. 35. No. 5. 4 pp. With 2 text figs. [16 refs.]

This case occurred in Java. The patient gave no history of dysentery. He was a drinker and confessed to lues. No amoebae or cysts were found in faeces. In scrapings from the large spreading undermined necrosing ulcer in skin and subcutaneous tissue over the caecal region amoebae were demonstrated. BRUG considered these amoebae typical *E. histolytica.* Irrigation of lesion with rivanol solution proved ineffective. In course of the illness thrombo-phlebitis of right thigh developed. Complete cure followed emetine injections. The authors surmise that an intestinal amoebiasis caused a perforating ulcer in or near the caecum resulting in pericaecal abscess which spread to front abdominal wall. Observation of this cutaneous amoebiasis showed a fulminating excentric extension of necrosis by continual renewal of infiltration of the walls of the ulcer, followed by necrosis ; giving an idea of what perhaps takes place in amoebic abscess of the liver.

H. M. H.

GUNN (Herbert) & HOWARD (Nelson J.). **Amebic Granulomas of the Large Bowel: their Clinical Resemblance to Carcinoma.**—*Jl. Amer. Med. Assoc.* 1931. July 18. Vol. 97. No. 3. pp. 166–170. With 8 text figs. [9 refs.]

A valuable and well illustrated study of three cases of amoebic granuloma of the large bowel. The pathological process consists in persistence of an isolated chronic ulcer with progressive erosion of the wall of the bowel. In response to the amoebic ulceration and secondary infection, large amounts of oedematous fibrous granulation tissue appear. This process affects the entire bowel wall and the neighbouring mesocolic fat. As consequence, tumour masses are formed. These amoebic granulomas may easily be mistaken for carcinoma, for they give symptoms, physical signs and radiologic appearances that may be identical with those produced by carcinoma. *E. histolytica* is world wide in its distribution, and infections with it do not necessarily produce diarrhoea or dysentery.

H. M. H.

DE MELLO (Froilano). Considérations à propos de la cystite amibienne.—[**Amoebic Cystitis.**]—*Arquivos da Escola Méd.-Cirurg. de Nova Goa.* Ser. A. 1931. No. 6. pp. 761–766.

The author's case occurred and was studied in 1926: he now reports it. A youth developed haematuria with pain and frequency of micturition. No gonococci were found and there was no recto-vesical fistula. Fresh urinary deposit showed, by microscope, amoebae. Wet fixed smears stained by iron-haematoxylin and eosin, revealed, besides typical haematophagous leucocytes, other cells whose cytoplasm and nuclear structure were identical with those of the dysentery amoeba. Furthermore the urinary deposit inoculated into a cat's rectum—anus then closed for 24 hours by collodion tampon—produced in the cat an acute and mortal dysentery. The ulcerated intestine at autopsy yielded many typical amoebae, which were studied in wet fixed and iron haematoxylin stained smears. Lastly, the cystitis was rapidly cured by emetine injections. Later there was a slight relapse, again quickly cured by emetine, and now it was found that the patient who had never had dysentery, was a carrier of cysts of the dysentery amoeba. His stools inoculated into cat's rectum produced a fatal dysentery in the animal.

H. M. H.

GOWANS (F. J.). **Thrombo-Phlebitis Migrans. A Case traced to Chronic Infection with** *Entamoeba histolytica.*—*Jl. Roy. Nav. Med. Serv.* 1931. July. Vol. 17. No. 3. pp. 212–213. [1 ref.]

During 6 months' repeated attacks of thrombo-phlebitis search in tonsils, teeth, sinuses and every other usual source of infection proved negative. Faeces examination revealed numerous cysts of *E. histolytica.* There was no history of dysentery or diarrhoea. After emetine, E.B.I., and yatren; cysts disappeared from stools and no further phlebitis occurred. [Compare MARWITS & VAN STEENIS case, above, p. 254.]

H. M. H.

ANDERSON (W. E.). **The Treatment of Entamebic Dysentery by Duodenal Injection of Ipecac.**—*New Orleans Med. & Surg. Jl.* 1931. July. Vol. 84. No. 1. pp. 46–48.

Frequent lacto-farinaceous feeds; then after twelve hours' fast a duodenal tube is passed well into the duodenum, its location determined

preferably by X-ray ; closure of pylorus is encouraged by giving 4 to 5 oz. cold milk alongside of tube ; then transduodenal lavage—500 cc. of a 10 per cent. aqueous solution of sodium and magnesium sulphate—run slowly into duodenum; this usually produced a copious watery evacuation in 30 minutes, cleaning the ulcer bases ; twenty minutes after giving salt solution, 1 dram powdered ipecac. in 100 to 200 cc. warm water is poured down the tube, followed by 50 cc. more of water to wash out the tube ; the tube is left *in situ* for few minutes as in its removal a little ipecac. might be carried into stomach and occasion persistent vomiting ; one hour later patient resumes feeds. This treatment is repeated daily for seven days ; then after a rest for seven days another seven days' intubation treatment. The author declares that in the 6 cases thus treated symptomatic improvement was noted 24 hours after first treatment, and in most cases stools remained negative for both amoeba and cysts. [This type of treatment appeared very logical to the author, and that it was not uncongenial to at least one patient is shown by his return for more. Is there not here a method to be tried before resort to -ostomy?]

H. M. H.

Biggam (A. G.), Halawani (A.) & Ragab (A.). **The Treatment of Amoebic Dysentery by Oral Yatren.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 209–210.

A study of cases in Cairo. Each pill contained 0·25 gram yatren. Two pills t.i.d. failed to bring about any definite improvement. Three pills t.i.d. for same period of time gave beneficial results. Best results were obtained by four pills t.i.d. for 15 consecutive days.

Of 37 patients treated by the last method no curative effects were observed in 2 : symptoms, and vegetative forms of *E. histolytica* persisted at the end of the course. Satisfactory tests to determine permanence of cure could be carried out only in 18 of the 37 cases ; of these 13 (72·2 per cent.) were found to be apparent cures, 5 were failures. The other 17 cases must be classified as uncertain, but in these complete relief from dysenteric symptoms had been obtained at end of a course of treatment.

As far as could be detected by sigmoidoscopy amoebic ulceration of rectum had generally completely healed by end of the course. Diarrhoea often persisted, being kept up by the drug, and subsided only on its discontinuance.

H. M. H.

Brown (Philip W.) & Osterberg (Arnold E.). **Toxicity and Rate of Elimination of Organic Arsenicals (Stovarsol and Treparsol) in the Treatment of Endamebiasis.**—*Amer. Jl. Med. Sci.* 1931. Aug. Vol. 182. No. 2. pp. 257–261. [10 refs.]

The authors' data tend to show that treparsol is more rapidly eliminated than stovarsol and is therefore probably the safer drug.

H. M. H.

RATCLIFFE (Herbert L.). **A Comparative Study of Amoebiasis in Man, Monkeys and Cats, with Special Reference to the Formation of the Early Lesions.**—*Amer. Jl. Hyg.* 1931. Sept. Vol. 14. No. 2. pp. 337–352. With 13 figs. on 4 plates. [15 refs.] [Med. School, Univ. of Pennsylvania, & Lab. of Comp. Path., Philadelphia Zool. Soc., Philadelphia.]

This study of the histology of intestinal amoebiasis in monkeys belonging to two S. American genera (Ateles, Lagothrix) showed that the first lesions were superficial erosions of the mucosa. These were followed by development of undermining ulcers whose origin was the solitary lymph follicles of the large gut. When tissue was fixed immediately after death the amoebae were seen in the mucosal lesions but not in the submucosa. Apparently the rôle of the amoebae was superficial destruction of the mucosa, which allowed pyogenic bacteria to invade the lymph vessels and produce submucous abscesses in the follicles, which ruptured into the intestine and formed undermining ulcers. When tissue is fixed 12 to 24 hours post mortem striking differences were seen—extensive necrosis of mucosa and deep invasion of gut wall by the amoebae, which were also found in large numbers in and about the ulcerated follicles; while the inflammatory reaction about the ulcers, prominent in fresh tissue, was not so striking. Leucocytes as well as the remnants of follicles had undergone degeneration. These changes were very similar to those described in human intestinal amoebiasis and probably originated in much the same way. Amoebae deep in the tissues in man might be accounted for by post mortem invasion, since descriptions are made from tissue fixed several hours after death.

The lesions of intestinal amoebiasis in the cat did not appear to be comparable with those in primates. In the cat there was direct invasion and destruction of gut wall by the amoebae, usually accompanied by inflammatory reaction of the whole wall, indicating bacterial as well as amoebic action. True undermining ulcers, comparable with those in primates, probably did not occur, and lesions presented as such seemed to have another explanation.

H. M. H.

FAUST (Ernest Carroll). **A Study of Canine Amebic Colitis.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. June. Vol. 6. No. 4. pp. 391–400. [15 refs.] [Dept. of Trop. Med., Tulane Univ., New Orleans.]

The author used fresh caecal material containing *E. histolytica* withdrawn through the rectum; this was inoculated into the posterior ileum, so that inoculum passed into the large bowel under conditions paralleling those in nature. Infection of 84 per cent. of 50 dogs was thus obtained, refuting the prevailing idea that the dog is an unfavourable subject for infection with *E. histolytica*. The symptoms of infection are essentially those occurring in man. By regulating the conditions, particularly diet, successive stages of acute, subacute, chronic, and probably " carrier " states of amoebic colitis can be produced and studied.

H. M. H.

BACILLARY DYSENTERY.

i. ZIA (S. H.). **The Occurrence of Dysentery and Typhoid Antibodies in Joint and Pleural Exudates.**—*Nat. Med. Jl. China.* 1931. June. Vol. 17. No. 3. pp. 302–306. [5 refs.]

ii. —— & SMYLY (H. J.). **Arthritis in Association with Bacillary Dysentery. Report of Case and Discussion.**—*Ibid.* pp. 307–312. [11 refs.] [Peiping Union Med. College, Peking.]

i. Arthritis in a patient with recent history of bacillary dysentery. Agglutinins for *B. dysenteriae* in the joint fluid and a genito-urinary infection with gonococci were found. Joint fluid from the patient and pleural exudates in rabbits after active and passive immunization, were found to contain specific agglutinins of high titre. This seemed to be the result of rapid passage of these antibodies from blood to exudate.

ii. Full report and discussion of three cases of arthritis accompanying or following bacillary dysentery among 900 cases of that disease. In all the knee joints were the principal, and in two, the only joints affected. None showed eye lesions. All recovered with no permanent deformity or damage to affected joints. The authors declare that the association cannot be regarded as proved.

H. M. H.

PERUZZI (Mario). **Some Cases of Intestinal Infection due to Castellani's Metadysentery Bacilli.**—*Jl. Trop. Med. & Hyg.* 1931. Nov. 2. Vol. 34. No. 21. pp. 358–360. [30 refs.]

The intestinal infections studied during 8 months were those caused by the principal metadysentery bacilli of CASTELLANI. That these infections do occur in Egypt is considered as proved. A number of the organisms were isolated. Affections caused by them were acute or chronic, febrile or non-febrile, dysenteric or non-dysenteric. The symptoms were rather indefinite " with occasional attacks of diarrhoea and at times irregular fever."

W. F. Harvey.

NAKATOMI (Ikuma). Etude expérimentale sur l'anavaccin provenu des bacilles paratyphiques B et des bacilles dysentériques du type Shiga. [**Study of the Anavaccine from Paratyphoid B and Shiga Dysentery Bacilli.**]—*Sei-I-Kwai Med. Jl.* 1931. June. Vol. 50. No. 6 (544). [In Japanese. French summary pp. 10–12.]

Anavaccine, which is prepared by the action of formol and heat on a suspension of the organisms in normal salt solution, is compared with the corresponding anatoxin. The anavaccine is found to lose almost completely its original toxicity and to retain completely its antigenic power.

W. F. Harvey.

Hérivaux (A.) & Rahoerson (R.). Sondage épidémiologique sur les Shiga-infections au moyen de la séro-agglutination. [**Discovery of Shiga Infection by means of Sero-Agglutination.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 612–614. [Pasteur Inst., Antananarivo.]

The authors give an account of the discovery of Shiga-dysentery infections for the first time in Antananarivo by means of agglutination reactions of patients' sera.

W. F. Harvey.

Alexeieff (A.). Sur la pseudo-pycnose des neutrophiles dans la dysenterie amibienne.—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 469–471.

Anderson (Hamilton H.) & Reed (Alfred C.). Amebiasis. Comments on Various Amebacides. Report of Case.—*California & Western Med.* 1931. Dec. Vol. 35. No. 6. pp. 439–442. [2 refs.] [Pacific Inst. of Trop. Med., Univ. of California, San Francisco.]

Antonelli (Giovanni). Alcune considerazioni sopra un caso di ascesso del fegato guarito con la cura emetino-arsenicale.—*Policlinico.* Sez. Prat. 1931. Sept. 14. Vol. 38. No. 37. pp. 1352–1356.

Biggam (A. G.) & Ragab (A.). Rupture of Amoebic Liver Abscess into the Peritoneal Cavity, Certain Points concerning its Diagnosis and Treatment. —*Jl. Trop. Med. & Hyg.* 1931. Sept. 1. Vol. 34. No. 17. pp. 285–287. [8 refs.]

Brink (C. D.). Amoebic Dysentery with Acute Hepatitis.—*Jl. Med. Assoc. South Africa.* 1931. Oct. 24. Vol. 5. No. 20. pp. 675–676.

Brooke (Percy A.) & Goodale (Raymond H.). Amoebic Dysentery in Massachusetts. Report of Five Cases.—*New England Jl. of Med.* 1931. July 16. Vol. 205. No. 3. pp. 130–134. [5 refs.]

Brown (J.). Amoebic Dysentery.—*Med. Jl. Australia.* 1931. Sept. 26. 18th Year. Vol. 2. No. 13. pp. 392–393.

Dargein & Plazy. Amibiase pulmonaire pure ; vomique ; guérison rapide par l'émétine, maintenue et vérifiée ultérieurement.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. Nov. 9. Year 47. 3rd Ser. No. 29. pp. 1639–1642.

Hickey (G. V.). Endemic Amoebic Dysentery.—*Med. Jl. Australia.* 1931. Oct. 24. 18th Year. Vol. 2. No. 17. p. 517.

Houssiau (F.). A propos d'irido-cyclite vraisemblablement en rapport avec une dysenterie amibienne.—*Bruxelles-Méd.* 1931. Nov. 1. Vol. 12. No. 1. p. 9.

Hsu (I. T.). Amoebiasis of the Lungs.—*China Med. Jl.* 1931. Nov. Vol. 45. No. 11. pp. 1097–1101. [P. F. Bresee Memorial Hosp., Ta Ming Fu, Hopei.]

Lefrou (G.). Le diagnostic et le traitement de la dysenterie bacillaire en Afrique. —*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 505–511. [5 refs.]

Little (J. L.). A Case of Balantidium Dysentery in Canada.—*Canadian Med. Assoc. Jl.* 1931. Dec. Vol. 25. No. 6. pp. 653–657. With 5 text figs. [22 refs.] [Dept. of Path. & Bact., Univ., Toronto.]

Macdonald (Ian). Amoebiasis in the Temperate Zone. Remarks on Seven Cases.—*Lancet.* 1931. Dec. 26. pp. 1404–1406. [15 refs.]

Majumder (A. R.). The Use of Kurchi Alkaloids in the Treatment of Amoebiasis. —*Jl. Trop. Med. & Hyg.* 1931. Aug. 15. Vol. 34. No. 16. pp. 265–267. With 1 chart in text.

Marín (Rafael A.). Preliminary Note on the Morphology and Pathogenicity of *E. histolytica* in P.R.—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. June. Vol. 6. No. 4. pp. 429–434. With 1 fig. [7 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

DE MURO (Paolo). Alcune osservazioni sui bacilli metadissenterici di Castellani.—*Ann. d'Igiene.* 1931. May. Vol. 41. No. 5. pp. 309–317. With 2 text figs. [30 refs.] [Ross Inst. & Hosp. for Trop. Diseases, London.]

MUSGRAVE (William E.), the late. [Edited by Alfred C. REED.] Amebiasis. A Clinical Study.—*Amer. Jl. Trop. Med.* 1931. Nov. Vol. 11. No. 6. pp. 469–503. [Pacific Inst. of Trop. Med., Univ. of California, San Francisco.]

OLMER (D.). De quelques hépatites amibiennes méconnues.—*Marseille-Méd.* 1931. June 5. Vol. 68. No. 16. pp. 697–705. [3 refs.]

OLMER (D.), BOTREAU-ROUSSEL (P.) & BLANCHARD (M.). Accès grave de tachycardie paroxystique au cours du traitement émétinien d'une dysenterie amibienne.—*Marseille Méd.* 1931. Feb. 25. Vol. 68. No. 6. pp. 279–282.

PENINGTON (Raymond G.). Amoebic Hepatic Abscess in a New Britain Native.—*Med. Jl. Australia.* 1931. Aug. 15. 18th Year. Vol. 2. No. 7. pp. 199–200.

PERUZZI (Mario). Le *Vibriothrix zeylanica* Castèliani dans les dysenteries et dans les entérites à Alexandrie.—*Rev. Prat. Malad. des Pays Chauds.* 1931. Oct. Year 10. Vol. 11. No. 10. pp. 443–448.

PETRIDIS (Pavlos). Le traitement chirurgical de la dysenterie et de ses complications locales.—*Rev. Prat. Malad. des Pays Chauds.* 1931. Aug. & Sept. Year 10. Vol. 11. Nos. 8 & 9. pp. 345–386 ; 395–433. [60 pp. text, remainder advertisements.] [Refs. in footnotes.]

QUÉRANGAL DES ESSARTS (J.). La dysenterie amibienne autochtone au Port de Brest.—*Arch. Méd. et Pharm. Nav.* 1931. Oct.–Nov.–Dec. Vol. 121. No. 4. pp. 456–470.

STALDER (H.). Zur Frage der chronischen Amöbendysenterie in unseren Breiten.—*Schweiz. Med. Woch.* 1931. July 4. No. 27. pp. 641–644. [16 refs.]

STEFANO (Umberto). Contributo allo studio dell' amebiasi vescicale.—*Arch. Ital. Sci. Med. Colon.* 1931. Aug. 1. Vol. 12. No. 8. pp. 463–469. With 1 text fig. & 1 coloured plate. English summary. [Inst. of Colonial Path., Univ., Modena.]

LEPROSY.

Leprosy Review. 1932. Jan. Vol. 3. No. 1. pp. 1–46. With 6 figs., 3 maps & 1 plan on 4 plates. Quarterly Publication of the British Empire Leprosy Relief Association, 29 Dorset Square, London, N.W.1.

This publication deals chiefly with published work, but includes new information on the incidence and campaigns against leprosy in the Empire especially. In this issue the important campaign to eradicate the disease from the Southern Anglo-Egyptian Sudan is reported on by A. Cruickshank, who records 1,556 cases, 2·8 per cent., discovered among the 58,136 of the Yambio district as the result of a survey of the entire population. An uninhabited area of 30 square miles has been reserved for a leper colony and within eighteen months 2,700 cases were admitted, housed and treated; a number which was increased to 3,220, or 5·3 per cent. of the population, after a second survey, so that 84 per cent. of the total cases are now segregated. In the Tambura district between 1927 and 1930, 2,123 were admitted to another leper settlement, and a further survey revealed 3,300 cases among 61,000 cases, or 5·5 per cent., mostly mild early cases suitable for treatment. At the time of writing no less than 4,800 out of the 6,500 found are segregated with land to cultivate so as to be largely self supporting. All the infectious cases are now isolated and treated and those left free are uninfective. This high incidence is fortunately mainly due to mild uninfective cases with a tendency to self-arrest before permanent damage has occurred, so he advises segregation and active treatment of only the infectious cases, and early ones should be watched and treated at clinics if symptoms become active. Improved social and dietetic conditions to raise resisting powers are the best prophylactic measure. This great effort to stamp out leprosy will be watched with much interest by all leprologists. Other articles are by N. E. Watson on the much discussed subject of leprosy in Hawaii, by R. G. Cochrane on work in Rhodesia and by E. Muir on the well known anti-leprosy methods used in India.

L. Rogers.

China Medical Journal. 1931. Sept. Vol. 45. No. 9. pp. 815–917. With 10 plates. **Leprosy Number.**

The issue of this special number is a striking testimony to the increased interest in the leprosy problem in recent years, but it is necessarily largely an epitome of already published work so only a few outstanding points need be dealt with here. Five of the articles deal with the prevalence of leprosy in three eastern provinces, Southern Yunnan, the Swatow district, Szechwan, and in the less known areas respectively. Koreans are found to be four or five times as much affected as Chinese and Japanese, and the disease has become more common in Manchuria with the recent immigration of hosts of Chinese. In Yunnan 240 patients have already been admitted to a leper colony. Swatow is said to have at least 30,000 lepers and the Kwantung Province several hundred thousand, for whom Missions are organizing clinics. In Korea three missions and one government institution provide for 2,500 of the many thousand lepers and some villages are financing dispensary treatment. An illustrated account of the very successful

leper colony in Korea is contributed by R. M. Wilson and an article on prophylaxis against leprosy by L. Rogers urges repeated examination of all contacts to enable the earliest stages to be found and cleared up by early treatment. Numerous extracts from current literature are also given.

L. R.

Leprosy in India. 1931. Vol. 3. Jan., Apr., July & Oct. Nos. 1, 2, 3 & 4. 171 pp. Issued quarterly by the Indian Council of the British Empire Leprosy Relief Association.

"Leprosy in India" is published by the Indian Council and four numbers for 1931 have been sent for notice. A number of further surveys are reported, which are mainly of local interest; extracts of current literature are also published.

L. R.

Muir (Ernest). **Factors influencing the Endemiology of Leprosy in India.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 173–176. [School of Trop. Med. & Hyg., Calcutta.]

This short paper estimates the probable number of lepers in India, judged by numerous surveys already made, at between 500,000 and one million, but the majority of the cases are slight and uninfective. It is most prevalent in the poor lower social classes and castes, with overcrowding and promiscuous social and sexual habits, and among overcrowded industrial labour classes; among the latter, 12 per cent. of infections have been found, and the average rate is 1 to 2 per cent. Secondary helminthic and other infections and deficient diet favour infection, and improved transport aids its spread.

L. R.

Robineau. La lèpre en Afrique Occidentale Française et sa prophylaxie. [**Leprosy in French West Africa and its Prevention.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 708–716. [2 refs.]

The results of this instructive survey are summed up in the following table which speaks for itself.

Colonies	Population examined	Number of of lepers	Proportion per mille
Ivory Coast	?	1,000(?)	?
Dahomey	?	?	?
Guinea	1,359,295	2,757	2·02
Upper Volta	2,712,892	6,792	2·50
Mauritania	?	?	?
Niger	?	?	?
Senegal	1,136,223	1,587	1·39
Sudan	1,880,290	7,761	4·12
Totals	7,088,700	19,897	2·50

L. R.

EASMON (M. C. F.). **Notes on a Survey of Leprosy in Sierra Leone.**—*Sierra Leone Ann. Rep. Med. & San. Dept. for the Year 1930.* IX. Scientific. pp. 38–40.

The author mentions that Dr. WINTERBOTTOM's 1796 book does not mention leprosy in this colony, but Robert CLARKE in 1843 recorded 34 cases in the Kissy hospital. By 1928 the number had increased to 129, and at this time BLACKLOCK saw 183 cases in the Northern Province and reported that the number "must be very large." The people do not fear or avoid lepers. So far the newer treatments have not produced rapid alleviation in the class of cases seen in the hospitals.

L. R.

DIXEY (M. B. D.). **Some Observations on Leprosy in the Gold Coast and British Togoland.**—*West African Med. Jl.* Lagos. 1931. July. Vol. 5. No. 1. pp. 3–5. [5 refs.]

The author has worked for some years as leprosy officer in this area, and he reports the lowest incidence among tribes in the western portion of the Gold Coast, who carry out some segregation, and the highest, over 21 per mille, in the Eastern Province and also much in the North. Of 4,000 known cases considerably over 2,000 are under treatment in 18 out-patient clinics and in a large settlement. The nerve type predominates. The Ho settlement in Togoland has 515 inmates out of 776 known cases or over 7 per mille of the population. In over one-half the disease was first noticed between the ages of 10 and 30, and in over three quarters between 10 and 40 as elsewhere in Africa. In 30 per cent. prodromata in the form of pain, fever, paraesthesia etc. preceded the initial lesion. Nine months' treatment of the 515 Ho cases showed various degrees of improvement in 461.

L. R.

AUSTIN (C. J.). **Report on Central Leper Hospital, Makogai.**—*Fiji Ann. Med. & Health Rep. for Year 1930.* pp. 58–63.

——. **Leprosy in Children. (A Study of 100 Cases in the Central Leper Hospital, Makogai, Fiji.)**—*Ibid.* pp. 63–68. With 1 fig. [4 refs.]

This report is by C. J. Austin, who has succeeded Dr. NEFF. The admissions numbered 73, 29 were discharged on parole and 51 died. An outbreak of dengue attacked all the staff, but none of the lepers. 59 cases have remained negative bacteriologically and clinically for twelve months after treatment.

In the same report a study of 100 cases in children is described.

L. R.

LAQUIÈZE. Inspection médicale en Nouvelle-Calédonie. (Circonscription du Pont-des-Français). [**Medical Inspection in New Caledonia.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 716–723.

A resurvey has been carried out in an area visited by LEBOEUF in 1912. The population was found to have declined from 392 to 254 and the percentage of well-marked and of suspected leprosy had fallen from 6·88 to 6·29 per cent.

L. R.

Lie (H. P.). La lèpre en Norvège. [**Leprosy in Norway.**]—*Acta Dermato-Venercologica.* 1931. July. Vol. 12. No. 2. pp. 105–114. With 2 text figs. English summary.

This is an address to a tuberculosis conference on the well known history of leprosy in Norway, and its control by a humane form of segregation with very little compulsion. The cases have fallen from 2,858 in 1856 to only 68, among three million people, mostly old uninfective nerve cases. In the five years 1861–65, 1,040 lepers were found, but since 1925 only three new cases have been met with and the disease is likely soon to be stamped out after being prevalent for at least seven centuries.

L. R.

Carrillo (Francisco), Fernández (José M. M.) & Schujman (Salomón). La lepra en Rosario. [**Leprosy in Rosario.**]—*Semana Méd.* 1931. Dec. 24. Vol. 38. No. 52 (1980). pp. 1932–1938.

Judging from the authors' experience at the National Hospital and from visits to and enquiries at other sources, there were 170 lepers in Rosario in 1929. During 1930 they have seen 70 new cases. Clearly the numbers are increasing rapidly and investigation into the histories of the patients shows that 63 of 112 (59 per cent.) acquired infection locally. As regards age 18 per cent. were below 20 years, 55 between 20 and 50 years and 27 over 50 years. 63 per cent. were males, 37 females. The vast majority, 70 per cent., were Argentines; next came Italians, 22 per cent.

In order to take the matter in hand effectually, it is necessary first to make a census in the district; secondly, to organize treatment by establishing one or more leper colonies, a hospital and a dispensary; and thirdly, to help prophylaxis by educating the public.

H. H. S.

Badger (L. F.). **Leprosy: a Study of the White Blood Cells and their Relation to Clinical Progress.**—*Public Health Rep.* 1931. Nov. 20. Vol. 46. No. 47. pp. 2782–2802. With 5 charts in text. [29 refs.]

The main results of this careful study of the leucocyte changes in 200 cases of leprosy are summarized in the following table.

A comparison of the average percentages of neutrophiles, lymphocytes, and monocytes in the various stages of activity.

Stage	Number of cases	Neutrophiles	Lymphocytes	Monocytes
		Per cent.	Per cent.	Per cent.
Acute reactions	10	80	15·8	3·6
Subacute reactions	6	70·8	24·7	3·3
Chronic reactions	8	65	29·5	2·6
Slow definite improvement ...	42	45·6	43·7	7
Quiescence	19	57·9	35·6	4

During acute and sub-acute reactions the polynuclears number from 70 to 80 per cent. and the lymphocytes 15 to 25 per cent.; in chronic reactions the differential count is about normal, but in cases showing improvement or quiescence the polynuclears number only 45 to 57 per cent. and the lymphocytes 35 to 43 per cent. Thus the progress of the case can be gauged, for in 85 per cent. of the cases the leucocyte indications and the clinical progress were in agreement. A count made on admission will furnish an index as to the stage and progress of the disease, and an increase in the polynuclears may give the first warning of an approaching exacerbation while a continued high lymphocyte figure indicates a good prognosis.

L. R.

Henderson (John M.). **A Note on the Formation of Leprous Nodules in the Human Skin.**—*Indian Med. Gaz.* 1931. Sept. Vol. 66. No. 9. pp. 483–484. With 5 figs. (4 coloured) on 3 plates. [3 refs.] [School of Trop. Med. & Hyg., Calcutta.]

In this well illustrated short paper the writer emphasizes that nodules arise around emboli of lepra bacilli in the deep layers of the skin. When stained by Levaditi's silver method, and counterstained with weak fuchsin, the nodules are clearly defined as orange coloured masses. The retrogression of a nodule under treatment shows in the reactionary phase breaking down and fatty degeneration of the lepra cells with invasion of the nodule by polynuclear leucocytes, and surface nodules may show liquefaction and discharge of the contents of the nodule. During resolution there is gradually increasing fibrosis, with sclerosis of the small blood vessels, disintegration of the lepra cells and progressive diminution of the acid-fast bacilli with a proportionate increase of the granular forms.

L. R.

Aoki (T.). Die frühzeitige Diagnose und Therapie der Lepra. [**Early Diagnosis and Treatment of Leprosy.**]—*Japanese Jl. Dermat. & Urol.* 1931. Nov. Vol. 31. No. 11. [In Japanese. German summary pp. 137–146.] [Dermat. Hosp., Nagasaki.]

The author considers the earliest sign of leprosy to be the superficial anaesthesia of Muir, which is present in 99 per cent. of the cases. Deep analgesia, disturbances of heat and pain sensation and depigmented spots are other early signs. A rapid red-corpuscle sedimentation is also of value. He discusses the dangers of the iodide treatment, and advises intravenous injections of small doses, beginning with 1 cc. of a 5 per cent. solution, repeated in gradually increasing doses every 3 days. In the rare cases in which even 40 cc. doses produce no reaction it may be given orally up to 240 grains as advised by Muir. In cases with strong reactions after iodides he gives 0·01 gm. per kg. of calcium chloride with 1–5 cc. of 20 per cent. sodium salicylate solution. For local application he advises either 5 per cent. chrysarobin or 5 per cent. ichthyol and 2 per cent. salicylic acid. Hot sulphur baths at 50° C. are also relied on in Japan.

L. R.

CANAAN (T.). Beitrag zur Behandlung der Lepra. [**Treatment of Leprosy.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Nov. Vol. 35. No. 11. pp. 643–654. [Refs. in footnotes.] [German Hosp., & Lepers' Home, Jerusalem.]

The author is convinced that the most certain method of treatment is by the chaulmoogra derivates, by which the disease can often be curtailed in the sense of obtaining disappearance of the symptoms and of the bacillus with general improvement in health. In delicate persons, those with nephritis, advanced tubercle, anaemia, malaria, etc., the treatment is greatly handicapped. Potassium iodide is a very dangerous drug in leprosy, since aggravation, not controllable by subsequent treatment, may result from its use.

L. R.

DE RAYMOND (A.). Le traitement des lépreux au Tonkin par injections intraveineuses d'un savon total de chaulmoogra. [**Intravenous Injections of the Soap of Chaulmoogra.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. July–Aug. Vol. 9. No. 7. pp. 592–594.

PEIRIER. Soluté de chaulmoograte de soude pour injections intraveineuses.—*Ibid.* pp. 595–601.

——. Le principe actif des huiles de chaulmoogra.—*Ibid.* pp. 602–605. [Hyg. Lab., Hanoi.]

——. Les chaulmoogras du Petit-Lac.—*Ibid.* pp. 606–608.

Some chemical disadvantages of Rogers' original (1917) sodium gynocardate for intravenous use are pointed out, and various additions to overcome them are discussed. As the result of these, the following formulae, which proved innocuous on intravenous injection in rabbits, are recommended.

	I	II
Chaulmoograte of soda ¾ saturated	30 gm.	50 gm.
Antipyrine	28 gm.	25 gm.
Saccharose	51 gm.	47 gm.
Distilled water	1,000 cc.	1,000 cc.

Another formula is chaulmoograte of soda ¾ sat. 30 gm., antipyrine 26·5 gm., glucose or lactose 25 gm. and distilled water 1,000 cc.

L. R.

DE RAYMOND (A.). Essai d'un savon total de chaulmoogra dans le traitement de la lèpre. [**Chaulmoogra Soap in Leprosy.**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 770–772.

——. Le traitement des lépreux au Tonkin par injections intraveineuses d'un savon total de chaulmoogra.—*Ibid.* pp. 780–783.

A three months' trial in twenty lepers of Peirier's sodium chaulmoograte solutions, described above, showed that they were suitable

for both intravenous, subcutaneous and intramuscular injection. The injections were painless and relieved nerve pain and also had a tonic effect. Rapid healing of ulcers, diminution of infiltrations and paralysis, fading of erythematous patches and clear signs of retrogression of the disease were obtained of a more satisfactory nature than with any other treatment, but more prolonged trials are necessary to allow of general conclusions.

L. R.

Boez (L.), Guillerm (J.) & Marneffe (H.). Traitement de la lèpre par les savons à base d'huile d'hydnocarpus. [**Treatment by Chaulmoogra Soaps.**]—*Arch. Inst. Pasteur d'Indochine.* 1930. Apr. No. 11. pp. 27–32. With 10 figs. on 5 plates.

The authors consider that the introduction of the chaulmoogra soaps by " Roggers " was a definite advance on the oil, but he prefers to give it in the form of keratin coated pills, containing 0·30 gm. of the sodium chaulmoograte, between meals, 4 to 10 or 12 pills a day. His photos show definite improvement.

L. R.

Kingsbury (Jerome). **A New Antimony Compound in the Treatment for Leprosy.**—*Arch. Dermat. & Syph.* 1931. Dec. Vol. 24. No. 6. pp. 1053–1057. [8 refs.]

After references to Cawston's use of colloidal antimony for healing of leprous ulcers, and to that of Wildish on a trial at the Amatiklu Leper Institution of Zululand, the author records four cases of leprosy treated in New York with 3–3 diamino 4–4 dihydroxy arseno-stibino benzene, or M 303 for short. It is light brown, soluble in water and is acid, but is alkalized by the addition of 0·9 cc. of normal sodium hydroxide per decigram. The resulting disodium salt is diluted with physiological sodium chloride solution so that 0·1 gm. is contained in 10 cc., which is well borne on injection intravenously. Of the four cases in one " a cure " was obtained, two showed progressive improvement until transferred, and in the fourth decided improvement and arrest of the disease were noted. He therefore thinks the preparation is superior to chaulmoogra ethyl esters.

L. R.

Eubanas (Froilan). **Cocaine-Adrenalin in Leprous Neuritis.**—*Monthly Bull. Philippine Health Serv.* 1931. July. Vol. 11. No. 7. pp. 359–363. [6 refs.]

Neuritic pains are often very troublesome in leprosy and the author reports on injections into or around the thickened ulnar and other nerves of 1·0 to 1·5 cc. of a solution containing ½–1 per cent. cocaine and 5 per cent. adrenalin. Relief from pain is usually obtained in three to five days with an average of two injections, and no recurrence took place within six months.

L. R.

Rabello, Jr. & Portugal (H.). Sur la présence du bacille de Hansen dans les lésions d'érythème polymorphe, chez un lépreux. [*Mycobacterium leprae* **in the Erythema of Leprosy.**]—*C.R. Soc. Biol.* 1931. Dec. 18. Vol. 108. No. 37. pp. 1088–1089.

The authors have made microscopical examinations of the early erythematous lesions of the skin in leprosy and found congestion and oedema with lymphoid infiltration, together with a few acid-fast bacilli in the deepest layers and sometimes in the blood vessels.

L. R.

Gomes (J. M.). Estudos sobre a lepra—Estase bacillar. [**Studies in Leprosy. Bacilli in Peripheral Circulation.**]—*Brasil-Medico.* 1931. Nov. 14. Vol. 45. No. 46. pp. 1061–1065. [9 refs.] English summary. [Hyg. Inst., S. Paulo.]

The author has found that acid-fast bacilli can frequently be found in the apparently healthy skin of the finger tips, fore-arm and back shortly after an attack of the febrile septicaemic stage of leprosy, indicating the dispersal of the organisms through the blood stream.

L. R.

Rodriguez (Jose) & Plantilla (Fidel C.). **The Histamine Test as an Aid in the Diagnosis of Early Leprosy.**—*Monthly Bull. Philippine Health Serv.* 1931. May. Vol. 11. No. 5. pp. 236–240. [7 refs.]

This test is performed by placing a drop of 1 in 1,000 histamine phosphate on the healthy skin, and another on the affected skin, and pricking through the drops without causing bleeding. In skin with the nerves affected no change takes place, but in the healthy skin a sharply defined circle 3 to 4 millimetres in diameter around the prick becomes red in 20 seconds, followed by a flush or flare in the surrounding skin in another 15 to 30 seconds, and a wheal in 3 to 5 minutes. The absence of any reaction is fairly constant in bacteriologically negative leprotic nodules.

L. R.

Ota (M.) & Sato (S.). Reproduction de la lèpre chez les animaux par l'inoculation de cultures du *Mycobacterium leprae.* [**Leprosy transmitted Experimentally by Cultures of** *Mycobacterium leprae.*]—*C.R. Soc. Biol.* 1932. Jan. 15. Vol. 109. No. 1. pp. 29–32. With 2 text figs. [1 ref.] [Dermat. Clinic, Tohoku Imperial Univ., Sendai, Japan.]

These workers have now obtained cultures of 10 strains of *Mycobacterium leprae* by haemoculture from 65 lepers and they infected a white rat. They now report successful inoculation with a recently isolated orange coloured strain of two white rats with the production of evident skin lesions. Five guineapigs and four rabbits were also inoculated, and the organism was found subsequently in the internal organs without the production of evident naked eye lesions. They conclude that their cultures are the true Hansen's bacillus.

L. R.

Tisseuil (J.). Contribution à l'étude de l'allergie et de l'anergie dans la lèpre. [**Allergy in Leprosy.**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 766–769. [Gaston Bourret Inst., Nouméa.]

A rather thin emulsion of a leproma was sterilized by heating to 60° C. twice for one hour, and injected into both dermal leprous lesions and the healthy skin. In advanced cases little or no reaction occurred, but in early cases, with limited skin lesions, injections into the affected tissues produced a reaction within 48 hours with infiltration, redness and ecchymosis, slowly retrogressing after eight days, and in the healthy tissues a reaction commenced after a fortnight. The reactions are not of definite prognostic value.

L. R.

Morales-Otero (P.). **II. The Wassermann Reaction in Leprosy.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Sept. Vol. 7. No. 1. pp. 69–77. [16 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

The author has previously recorded that in 33,000 Wassermann tests in Porto Rico only 14·54 per cent. showed even weak reactions, but in lepers the proportion of positive reactions was 65 per cent. Further work on the cerebrospinal fluid of lepers showed that it was normal and free from acid-fast bacilli. Post-mortems showed that only one of eleven lepers giving a positive Wassermann during life showed visceral syphilis; this is contrary to what is found in syphilitic infections. Moreover, in lepers the reactions appear and disappear in a short time in the absence of antisyphilitic treatment, positive reactions tending to occur during febrile exacerbations in lepers, and antisyphilitic treatment is often harmful in them. He concludes that positive reactions in lepers do not indicate the presence of syphilis.

L. R.

Adant (M.). La cuti-réaction à la tuberculine chez les lépreux. [**The Tuberculin Skin Reaction in Leprosy.**]—*C.R. Soc. Biol.* 1931. Oct. 23. Vol. 108. No. 29. pp. 447–448. [2 refs.] [Bact. Lab., Elisabethville, Belgian Congo.]

There is a difference of opinion regarding the interpretation of tuberculin reactions in lepers as to whether they are due to leprosy alone or only to tubercular complications in that disease. The author has carried out tests with lepers, and with apparently healthy contacts, in Tropical Africa; in 17 lepers he obtained 8 negative and 9 positive reactions, and in 11 healthy contacts 5 were positive and 6 negative, so his results are inconclusive.

L. R.

Gohar (M. A.). **Study of the Antibody Contents of the Serum of Lepers.**—*Zent. f. Bakt.* I. Abt. Orig. 1931. Oct. 20. Vol. 122. No. 6/7. p. 516. [4 refs.] [Bact. Dept., Faculty of Med., Cairo.]

Sterile acid-fast-containing fluid extracts of nodules were employed as the antigen, but the blood serum of lepers showed no trace of complement fixing immune bodies or agglutinins against the leprosy bacillus.

L. R.

Le Guyon (R.). Sur l'étiologie de la lèpre des rats. Allaitement croisé par des mères saines de jeunes rats issus de mères lépreuses et inversement. [**The Aetiology of Rat Leprosy. Experiments in Cross-Suckling.**]—*C.R. Soc. Biol.* 1931. Nov. 27. Vol. 108. No. 34. pp. 792–794. [2 refs.]

The author noticed that the young of female rats with rat leprosy all died in 3 to 5 weeks after their birth, so he has tested the effect of allowing the young of leprous rats to be suckled by healthy females and vice versa. The result was that the rats born of healthy mothers when brought up by leprous females all died before the end of the fifth week and vice versa, so clearly hereditary infection played no part in causing the mortality.

L. R.

Boyé. Sur une maladie de la sarigue de Guyane présentant de grandes analogies avec la lèpre humaine. [**A Disease resembling Human Leprosy in the Opossum.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 637–639.

The author describes leprosy-like lesions in the opossum, *Philander cancrivor*, affecting the skin of a leg. At a post-mortem examination he found acid-fast bacilli in the inguinal glands, but not in the internal organs. He considers it premature to conclude that the disease is leprotic.

L. R.

Cochrane (R. G.). **Leprosy, its Prevention and Control.**—*Jl. State Med.* 1931. Oct. Vol. 39. No. 10. pp. 583–593. [19 refs.]

In this paper, mainly a summary of recent work, the author advises surveys with treatment of early cases, examination of contacts, school children and immigrants, training medical men and dressers, and propaganda.

L. R.

Mariani (Mario). Otto casi di lebbra familiare a Suzzara. [**Eight Cases of Familial Leprosy in Suzzara (Mantua).**]—*Arch. Ital. Sci. Med. Colon.* 1931. Nov. Vol. 12. No. 11. pp. 654–685. With 9 text figs. [50 refs.] English summary (5 lines). [Municipal Hyg. Office, Suzzara.]

Details of eight cases of leprosy are given, their clinical condition and the results of laboratory examinations. Two of the patients belonged to one family, six to another.

H. H. S.

Japanese Journal of Experimental Medicine. 1931. Oct. 20. Vol. 9. No. 5. pp. 403–507. **Leprosy Number.**

This is another volume of over 100 pages of references, with very brief summaries in some cases, to 509 papers on leprosy; it will be of great value to earnest students of the subject.

L. R.

Freise (Fred. W.). **Brazilian Drugs used in Leprosy.**—*Prescriber.* 1931. Nov. Vol. 25. No. 11. pp. 369–373. [1 ref.]

The botanical names, and contents, as far as is known, of 14 drugs which have been used in leprosy in Brazil, chiefly for local application, are given.

L. R.

Ferrier (P.). Traitement physiologique de la lèpre. [**Physiological Treatment of Leprosy.**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 852–860.

The author claims to have obtained good results in a few cases of leprosy by allowing sufficient time between meals, the avoidance of acids, including vegetable ones, and giving abundance of albuminous, but limited amounts of carbohydrates and fats.

L. R.

Roger (Henri). Lèpre à forme syringomyélique.—*Marseille-Méd.* 1931. Aug. 25. Vol. 68. No. 24. pp. 225–231.

Tisseuil (J.). Contribution à l'étude des léproïdes. Léproïdes en aire.—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 763–765.

Veerasingham (K. V.). Early Manifestations of Leprosy.—*Malayan Med. Jl.* 1931. Dec. Vol. 6. No. 4. pp. 104–107. [8 refs.]

Vigne (Paul) & Pédat. Un cas de maladie de Hansen.—*Marseille Méd.* 1931. June 25. Vol. 68. No. 18. pp. 809–812. With 1 text fig.

TROPICAL DERMATOLOGY.

Pezzi (Giuseppe). Contributo allo studio del " Piede di Hong-Kong." [**" Hongkong Foot."**]—*Ann. di Med. Nav. e Colon.* 1931. Nov.–Dec. 37th Year. Vol. 2. Nos. 5/6. pp. 713–722. With 2 plates. [11 refs.] [Catholic Mission Hosp., Hankow.]

Hongkong foot is the local name given to a condition of interdigital eczema which occurs in many, perhaps most, tropical countries. It is intensely irritating and owing to being rubbed or scratched often becomes acutely inflamed and complicated by the presence of staphylococcus and streptococcus. The author had 25 cases under his care, 9 Italians and 16 Chinese. The basal cause is an epidermophyton ; in two of the former and five of the latter he isolated *E. rubrum* and in the remainder *E. inguinale*. Four of the patients had lesions elsewhere, two in the inguinal fold, one on the right hand between the middle and ring fingers and one periumbilical ; from all these *E. inguinale* was grown. Treatment varies : some find ichthyol very useful ; others prefer iodine preparations or salicylic acid.

H. H. S.

Matras (August). Ueber Ekzema mycoticum an Händen und Füssen und seine Pathogenese. [**Mycotic Eczema of the Hands and Feet, and its Pathogenesis.**]—*Arch. f. Dermat. u. Syph.* 1931. Mar. 30. Vol. 163. No. 1. pp. 47–57. [14 refs.] [Dermat. & Syph. Clinic, Univ., Vienna.]

A study of 100 cases seen in Vienna. In 93 the feet were affected, but microscopical findings were positive in 74 only ; cultures were obtained from 58 and the trichophytin reaction was positive in 66. Among 74 of these cases there was " dyshidrosis " of the hands and the corresponding figures were only 12, 5 and 5. The question is therefore still obscure as local infection of the hands by fungus is rare. Nor can the hand lesions be reasonably ascribed to an allergic condition as the positive reactions to trichophytin are so few. In the opinion of the author, Dyshidrosis lamellosa sicca is however, always due to a local mycotic infection.

M. Sydney Thomson.

Beintema (K.). Schimmelziekten van handen en voeten. [**Mycotic Diseases of Hands and Feet.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. Aug. 22. 75th Year. No. 34. pp. 4302–4314. With 11 figs. (9 on 1 plate). [Dermat. Lab., Imperial Univ., Groningen, Dutch Guiana.]

Mycosis of fingers and toes is common in the U.S.A. and according to Hazen a large proportion of the well-to-do classes in the Southern States is infected with *Epidermophyton interdigitale* (Priestley). In Philadelphia of 100 students examined 49 showed mycoses of the feet. In Holland several cases amongst swimmers, have been seen recently by the author. The infection was apparently contracted in swimming baths where the fungi found a favourable medium in the wooden floor of the establishment. Cases were mainly seen during the summer when the growth of the epidermophyton was promoted by warmth. Covered and artificially heated swimming baths may become a permanent source of infection and it would be advisable to take measures to prevent

the use of floor mats, nail brushes and of laundry which cannot be sterilized. The author gives a detailed account of the clinical and bacteriological aspects of different types of mycotic diseases of hands and feet, and draws attention to the fact that microscopical examination of scabs from fingers is very often negative. Some writers ascribe the affection of the hands to an allergic reaction due to a mycotic infection elsewhere and they advise in these cases examination of the toes. The author is inclined to explain the absence of fungi in scabs from fingers as due to frequent washing of hands. The fact that in experiments inoculation with epidermophyton produces the same clinical picture shows in his opinion that these fungi are the primary cause of the disease and that they are not saprophytes growing on a dyshidrotic skin. The author summarizes the usual therapeutic measures and pays special attention to the treatment of mycotic infections of nails. He gives a warning not to stop the treatment too early, since recrudescence is very common in these cases.

H. Lwow.

Ruge (Heinrich). Zur Behandlung der Zwischenzehenekzeme in den Tropen und des sogenannten "Roten Hundes." [**The Treatment of Interdigital Eczema of the Feet in the Tropics and of "Prickly Heat."**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Jan. Vol. 36. No. 1. pp. 33–35.

The first section deals with the wet eruptions consequent on epidermophytosis. During the wet stage alcoholic lotions are recommended; these may contain 1 per cent. of silver nitrate, ½ to 2 per cent. of resorcin or copper nitrate, 1 in 5,000 to 1 in 500. Later, the more usual decorticants etc., are recommended. Great stress is laid on the fact that the feet must be kept out of water.

For mild cases of "prickly heat" rice powder containing a little Desitin is used. For more severe cases in which exudation has occurred, recourse is had to the above lotions. The author restricts the use of autohaemotherapy to the very severe cases.

M. S. T.

Acton (Hugh W.) & McGuire (C.). **Actinomycotic Lesions of the Skin of the Hands and Feet, due to** *Actinomyces keratolytica*, **n. sp.**—*Indian Med. Gaz.* 1931. Feb. Vol. 66. No. 2. pp. 65–70. With 14 figs. (5 coloured) on 3 plates. [10 refs.]

A detailed and well-illustrated article describing work done in Bengal. There are five types of lesion, all being seen among field workers when their feet are sodden during the monsoon months. These may be briefly described as onychomycosis, paronychia, eczematous lesions of the feet, keratolysis plantare sulcatum [this *Bulletin*, Vol. 27, p. 523], and a deep interdigital fissuring, which cleft is surrounded by thick, white and macerated epithelium (mango toe); occasionally this last lesion ulcerates deeply, the ulcus interdigitale of Castellani. The organism has been demonstrated microscopically by McGuire's toluidine blue stain and has also been cultivated successfully on Norris' medium in every one of the forty-two cases quoted. It has also been found in horse and cow-dung. There is a very full description

of the fungus which has been provisionally named *Actinomyces keratolytica* (n. sp.). The lesions are easily cured by glycerine-formaldehyde (♏i to ♏i) or by 5 per cent. gentian violet lotion, the dressings being carried out twice daily for three weeks.

M. S. T.

Beron (B.). Zwei autochthone Fälle von Myzetoma mit schwarzen Körnern. [**Two Cases of Mycetoma with Black Grains.**]—*Dermat. Woch.* 1931. Feb. 21. Vol. 92. No. 8. pp. 265–272. With 15 text figs.

The patients were two brothers, aged twelve and seven years, who have never left the neighbourhood of their native village near Sofia. In both, one foot was affected by painless, nodular tumours. The inguinal glands were swollen and showed fistulae. There were also a few subcutaneous nodes scattered over their bodies. Bony absorption was demonstrated in the foot of one boy. It is noteworthy that both patients and one sister, all suffered from Keratoma maculosa disseminata symmetrica palmaris et plantaris. Black granules were obvious clinically and the presence of a fungus was amply demonstrated by the microscope. An addendum describes a third mild case in a young man from the same district of Bulgaria. The illustrations are good, and also illustrate the keratolysis on the feet unaffected by the growths.

M. S. T.

Grantham-Hill (C.). **Some Clinical Observations on Mycetoma.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. June 30. Vol. 25. No. 1. pp. 39–48. With 12 figs. on 4 plates. [9 refs.]

Observations based on cases seen in Khartoum, 118 being of the black grain (maduromycotic) variety and 66 of the yellow grain (actinomycotic) type. Native opinion favours a thorn prick as the probable causative factor and in over 30 per cent. of these cases of less than six months duration, thorns were actually found embedded in the growth. The vast majority of the lesions occur on exposed parts and none were seen in people who wore boots. The actual plant has not been incriminated, but the Acacia family is under suspicion. Whilst the actual incubation period is unknown, one well-authenticated case showed nodules two months after a fall into a "thorn-bush." Intercurrent debilitating disease seems to play a large part in the rate of growth of mycetoma, whilst dissemination apparently occurs by direct spread through the tissues and not by the lymphatics in the majority of cases. The yellow variety would seem to be the more dangerous, having a much higher amputation and relapse rate. It spreads rapidly in bone where it frequently causes periostitis, necrosis, rarefying osteitis or occasional new bone formation which radiologically closely resembles a periosteal sarcoma. All chemotherapy is slow and as it is difficult to keep natives under treatment, surgical methods are recommended. Full details of technique are given, including the guiding naked-eye appearance of the tissues seen during operation.

M. S. T.

Froes (Heitor P.). **Mycetoma Pedis (Madura Foot) and its Incidence in Brazil.**—*Jl. Trop. Med. & Hyg.* 1931. Nov. 16. Vol. 34. No. 22. pp. 376–378. With 9 figs. on 2 plates. [5 refs.]

In all, only some 60 cases have been observed in Brazil. They were all typical and fell naturally into the groups of Phaneromycetomas (with nodules and sinuses) and Cryptomycetomas (without sinuses, but having a cystic appearance). The majority of the cases were Actinomycotic, of which six species have been found, *Nocardia bovis* being the most common. Five species of the Maduromycoses have also been seen. The author describes three cases very briefly and claims to have isolated a new fungus from one of them, to which he has given the name, "*N. genesii.*" Its grains are smaller than are those of *N. pelletieri* and *N. africana*, measuring only 150–300 μ. They are red, very hard and extraordinarily numerous. The fungus is difficult to grow, and is slow in development, but it can be cultivated on potato and on Sabouraud's gelose. [See also this *Bulletin*, Vol. 28, p. 694–5].

M. S. T.

Buchanan (J. C. R.). **Injections of Iodine as an Adjuvant to Surgery in the Treatment of White Mycetoma.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 111–114.

This treatment has been used in British Somaliland when complete surgical excision would result in deformity, etc. As much growth as possible is excised and then tincture of iodine is injected into any suspicious areas remaining. The raw surfaces heal well under mild antiseptic dressings, but the doubtful nodules are injected with 1 to 2 cc. of the iodine every ten days for about two months. The treatment causes no general reaction and only transitory local pain. Three cases are quoted in detail.

M. S. T.

Goldberg (Morris) & Pijper (Adrianus). **Sporotrichosis in a White Man.**—*Jl. Med. Assoc. South Africa.* 1931. Mar. 14. Vol. 5. No. 5. p. 140. [2 refs.]

The case of a German aged 42 years, who had been resident in various parts of South Africa for the previous seven years. Three months after his arrival in Bechuanaland a small red and fluctuating swelling appeared in front of the left ear. After evacuation the wound never healed and similar nodules arose under the chin, on the trunk etc. Deep cold abscesses developed, one over the right scapula attaining the size of a cocoanut. Although the patient was heavily infected and sallow, there was no fever. Pus from the abscesses grew typical colonies of *Rhinocladium* (*Sporotrichum*) *beurmanni*. After aspiration of the abcesses, the patient got rapidly well on potassium iodide in small to moderate doses.

M. S. T.

Morales (R.). Un cas de lymphangite sporotrichosique au Guatemala. [**A Case of Sporotrichosis with Lymphangitis in Guatemala.**]—*Ann. Parasit. Humaine et Comparée.* 1931. July 1. Vol. 9. No. 4. pp. 366–367. With 3 text figs. [General Hosp., Guatemala.]

Typical ulceration of the left wrist occurring in a native boy aged 18 years. Pure cultures of *S. beurmanni* were obtained from pus aspirated

from the epitrochlear gland. Although the disease is well-known in Guatemala this is apparently the first case in which the causative fungus has been determined with certainty.

M. S. T.

NAUCK (E. G.). Histologische Untersuchung über Dermatitis verrucosa und Mossy-Foot. [**Histological Investigation of Dermatitis Verrucosa and Mossy-Foot.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. July. Vol. 35. No. 7. pp. 394–410. With 18 text figs. [48 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

An account of cases seen in Costa Rica and in Africa, the causative organisms being *Phialophora verrucosa* Thaxter and *Acrotheca pedrosoi* Brumpt in dermatitis verrucosa, whilst Actinomyces were found in mossy-foot. It is stressed that differential diagnosis on clinical grounds alone is often impossible, but " the presence of fungous elements in a histologically recognizable granulation tissue makes the diagnosis of dermatitis verrucosa certain."

M. S. T.

ECCLES (C. E.) & DORLING (R.). **Cases of Pyosis Mansoni.**—*Jl. Roy. Army Med. Corps.* 1932. Jan. Vol. 58. No. 1. pp. 47–49. With 3 text figs.

The report of five cases, occurring in the same barrack room in Multan. The rash appeared on the flexor aspects in crops, the vesicular, pustular and impetiginous stages being succeeded by a purplish discoloration of the skin after healing. Small Gram-positive diplococci were found in the smears, particularly during the first two stages. The best results were obtained by the use of unguentum hydrargyri ammoniati dil., the cases clearing up within seven days.

M. S. T.

AARS (Charles G.). **Keratoma Plantare Sulcatum (Castellani).**—*Arch. Dermat. & Syph.* 1931. Aug. Vol. 24. No. 2. pp. 271–279. With 8 text figs. [11 refs.]

An account of this disease as seen among the natives of Dutch Guiana. The soles of men only were affected and then only during the rainy season. The author could find no evidence of fungus or other infection. It is distinguished from yaws by the absence of horny plugs, by a negative serum reaction, and by the lack of influence on it of antisyphilitic treatment. This differential diagnosis is further amplified by excellent illustrations of the two conditions.

M. S. T.

ROSNER (Simon). Sobre el tratamiento de los queloides. Resultados obtenidos en el Instituto de Medicina Experimental para el estudio y tratamiento del cáncer. [**The Treatment of Keloid in the Institute of Experimental Medicine, Buenos Aires.**]—*Bol. Inst. Med. Experim.* 1930. Dec. Vol. 7. No. 25. pp. 1375–1381. [16 refs.] French summary.

The author briefly reviews the numerous forms of treatment which have from time to time been employed in dealing with keloid growths

and gives details of 31 patients on whom he tried ray therapy. In his final report he omits all who failed to complete the course and he has been unable to trace 3 of the 31 whose details are given in the letterpress. Of the remaining 28, 18 are stated to have been cured, four showed marked improvement, four were slightly improved, and in two only was the treatment ineffectual. He regards this, consequently, as the method of choice. In some the lesions were extensive, involving in one patient the hand and forearm, the result of a burn, and several of those cured had had the lesion for as long as 5 years and one, who improved, for 10 years. The following is the standard laid down : 90 kilowatt, 2 milliampères, a 2 mm. aluminium filter, applied at a distance of 23 cm. from the lesion, a dose of 4–8 H, and a course of 4 to 6 applications at monthly intervals.

H. H. S.

Lefrou (G.). Contribution à l'étude du Larbish. [**Contribution to the Study of Larbish.**]—*Bull. Soc. Path. Exot.* 1931. Feb. 11. Vol. 24. No. 2. pp. 157–163. [6 refs.]

Larbish is the native name in Senegal for a dermatitis linearis. A similar affection is seen in Sierra Leone, Ivory Coast, Liberia, Gabon and the Cameroons. The " line " is a subepidermal burrow with surrounding inflammation and of an average diameter of 1·5 mm. This is filled with clear serum and spreads irregularly and capriciously, sometimes remaining stationary and sometimes advancing several cm. a day. The chief symptom is a burning sensation, worse at night, and more severe in white patients. All efforts to find a worm or larva have failed, but the blood shews a marked eosinophilia which drops after cure. Histologically the most striking change is a sclerosis of the local vessels. The disease is common only in the rainy season, and affects the feet and legs, but Europeans usually shew lesions on the hands as well. The local treatment consists of a poultice or decoction made from the leaves of *Hisbicus* [? *Hibiscus*] *Sabdariffa*. The method is extremely efficient, but the active principle is unknown.

M. S. T.

Ciurea (I.) & Stephanescou (Théodore). *Argas persicus* comme parasite de l'habitation humaine. [*Argas persicus* **infesting a House.**]—Reprinted from *Bull. Soc. Roumaine Dermat. et Syph.* 1929. Mar.–May. No. 2. 4 pp. With 2 text figs.

Three members of one family were bitten every night by an " insect." The reactions of each individual to the bite varied greatly ; in one, only small wheals were produced and in another, swellings the size of a hen's egg resulted. But all complained of intense irritation lasting for about eight days in spite of the fact that the urticaria lasted only twenty-four hours. The family lived in an upper flat in a new concrete building and there was no history of contact with pigeons or chickens, the usual hosts of these ticks. Investigation of the flat resulted in their being found only in the bed-rooms. Although three were picked off the ceiling, the exact location of their " nests " could not be found, and all efforts to disinfect the rooms proved useless.

M. S. T.

Augagneur. Dermite érythémato-bulleuse d'origine quinique. [**An Erythemato-Bullous Eruption due to Quinine.**]—*Ann. de Méd. et de Pharm. Colon.* 1931. July–Aug.–Sept. Vol. 29. No. 3. pp. 575–577.

A male coolie, aged 23, was given one gram of quinine sulphate *per diem* during an attack of malaria. The dose was divided into four parts and administered by the mouth. Three days later diarrhoea, nausea and abdominal pain accompanied the appearance of a generalized eruption. The lesions consisted of bullae, varying in size from that of a pea to that of a small nut, on a bluish erythematous base and were most closely aggregated on the trunk. The quinine was stopped and arsaminol substituted. After the patient had recovered, quinine was again administered and the same symptoms reappeared within twenty-four hours.

M. S. T.

Anderson (Nelson Paul) & Ayres (Samuel), Jr. **Dermatitis Venenata due to Wigandia Caracasana, a hitherto Unrecognized Cause. Report of Case.**—*California & Western Med.* 1931. Apr. Vol. 34. No. 4. pp. 278–279. With 1 text fig. [4 refs.]

Wigandia caracasana is a tropical American plant which has been introduced to California; the leaves are figured. The case was that of a nurse who had an itchy, weeping eruption on the face and forearms. In watering one of these plants daily she brushed against the foliage. Its poisonous property was known to the Japanese gardener. The patient submitted to a test with the leaf and stem, which produced next day an erythematous papular itching eruption. Five similar tests on normal persons were negative.

A. G. B.

Esler (A. R.). Pemphigus.—*Kenya & East African Med. Jl.* 1931. Feb. Vol. 7. No. 11. pp. 333–336. [1 ref.]

Mazza (Salvador) & Canal Feijóo (E. J.). *Micetoma* de granos negros por *Madurella* Sp. del Chaco santiagueño.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 244–254. With 10 figs. [13 refs.]

Mazza (Salvador) & Pasquini Lopez (Carlos). Micetoma podal actinomicósico observado en Tucumán.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 255–260. With 6 figs. [4 refs.]

Mazza (Salvador), Quintana (Hector) & de Los Rios (Miguel). Sobre un paramicetoma observado en Jujuy.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 261–268. With 8 text figs. [3 refs.]

Niño (Flavio L.). Blastomicosis humana generalizada por Criptococo (n. sp.).—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 117–167. With 60 figs. & 3 coloured plates. [2 refs.]

Niño (Flavio L.), Fernandez (Julián) & Palant (Miguel). Nuevas observaciones de onixis y peri-onixis de origen blastomicósico.—*6a Reunión Soc. Argentina Patol. Regional del Norte, Salta, 29 y 30 septiembre y 1 octubre, 1930.* pp. 35–99. With 82 figs. & 3 plates. [4 refs.]

SLEEPING SICKNESS.

LEE (S. W. T.). **Report on Sleeping Sickness for the Year 1930.**—*Uganda Protectorate Ann. Med. & San. Rep. for Year ended 31st December, 1930.* Appendix IV. pp. 88–93. [Received 7th September, 1931.]

The number of cases of sleeping sickness diagnosed microscopically in Uganda during the year 1930 was 638; in addition to those there were 89 suspects. Deaths due to the disease numbered 51. The author states that the low mortality rate is remarkable; although the figures are not entirely accurate they suffice to indicate that very few people actually die of sleeping sickness in Uganda. He considers that the explanation is due to one or both of the following factors: firstly, the result of treatment and, secondly, that the trypanosomes are not of a virulent nature. The routine treatment of sleeping sickness by tryparsamide alone has now been abandoned and two doses of Bayer 205 are included in each course of treatment. Generally speaking, the results achieved have been excellent.

In the second portion of the report the author considers the present state of the disease in the various infected areas. This requires no special comment and the paper should be consulted in the original by those interested.

W. Yorke.

McLEAN (N.). **A Sleeping Sickness Investigation in the Infected Areas of Kavirondo (1930–1931).**—*Kenya & East African Med. Jl.* 1931. Oct. Vol. 8. No. 7. pp. 180–199.

An account is given of previous investigations in the Kavirondo sleeping sickness areas, and the author then passes to a description of his own work. In the course of the investigation a total of 486 cases was discovered. The number of the population examined and the number of positives in the various regions are given in a table. The author states that in Kavirondo the disease is undoubtedly mild. Among 360 patients in all stages of the disease over 50 per cent. would admit of no illness at the time of examination. On close questioning complaints of headaches of various durations and intensities might be elicited. Somnolent cases were usually unmistakable and examination of the cerebrospinal fluid invariably clinched the diagnosis.

Whilst broadly speaking trypanosomiasis in the first stage is a haemic infection, in the second stage a glandular condition with trypanosomes scanty or absent from the peripheral blood, and in the third stage a central nervous involvement with hard scleroid glands in which trypanosomes can no longer be demonstrated, yet the division is not absolute. It was found that: (1) when trypanosomes were present in the glands they could invariably be demonstrated in the peripheral blood by examining thick films; and (2) in several cases in the third stage without glandular enlargement, but with a cerebrospinal count of over 1,000 per cmm., numerous trypanosomes were found in the peripheral blood. The author was unable to discover any evidence that persons suffering from trypanosomiasis ever recovered without treatment.

An investigation was made to ascertain whether an increased cell

count in the cerebrospinal fluid might be due to other diseases than trypanosomiasis, e.g., syphilis and yaws. The results of this investigation are given in a table which shows that the sigma titre of the cerebrospinal fluid is not increased in uncomplicated trypanosomiasis.

Treatment at the beginning of the investigation was rather of an experimental nature. The usual course for adults was three injections of Bayer 205, 1 gm., at weekly intervals, followed by three injections of tryparsamide, 2 gm., also at weekly intervals. Details of a considerable number of cases are given, from which it would appear that there is neither arrest nor a regression of the disease so far as the central nervous system is concerned after treatment with Bayer 205; and the clinical condition of the patients supports these findings. On the other hand, treatment with tryparsamide (10 to 16 gm. for an adult) invariably brought the cell count of the cerebrospinal fluid back to normal and the clinical improvement was dramatic. Several sleeping sickness lunatics, who had become a menace to the community, were known, after a course of tryparsamide, to settle down and lead useful and respectable lives. Details are given of a number of such cases.

Observations extending over 18 months on the treatment of 450 cases of trypanosomiasis have confirmed the views of numerous investigators that in tryparsamide we have a drug of unequalled therapeutic efficacy in *gambiense* infections. Only one case of blindness was observed. This was a man who had a cerebrospinal fluid count of 220 cells per cmm.; he had received three injections of Bayer 205, 1 gm. at weekly intervals, and subsequently three injections of tryparsamide, 4 gm., at four day intervals. The patient was seen six months later, unable to go about without assistance and almost completely blind.

The paper closes with certain recommendations for the future control of the disease.

W. Y.

Sorel & Robineau. La trypanosomiase en Afrique Occidentale Française. [**Trypanosomiasis in French West Africa.**]—*Ann. de Méd. et de Pharm. Colon.* 1931. July–Aug.–Sept. Vol. 29. No. 3. pp. 532–561. With 5 maps. [5 refs.]

In two maps the authors contrast the distribution of sleeping sickness in the French West African Colonies as it now exists, with the state of affairs in 1920.

To-day, endemo-epidemic areas are found only in Dahomey, in Haute-Volta and on the Niger. In Dahomey they comprise the district of Djougou and part of Atacora; the extent of their distribution is not yet exactly determined. In Haute-Volta the districts of Ouagadougou, Dédougou, Bobo-Dioulasso, Gaoua and Kaya are seriously involved. On the Niger the only place where there is any tendency to epidemicity is at Torodi in the district of Say. In all other colonies, with the exception of Mauritania, where the disease has never been observed, trypanosomiasis only occurs sporadically. A detailed description is given of the present position of sleeping sickness in Dahomey, Haute-Volta and the Niger, together with an account of the measures which are being adopted to combat the disease. This must be consulted in the original by those interested.

W. Y.

MARTIN (G.). Commission de la maladie du sommeil [MESNIL (M.), President] : rapport général. [**Report of (French) Sleeping Sickness Commission.**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 757–760.

A summary is given of the principles laid down by the previous Commissions of 1920 and 1924. The present Commission makes certain recommendations regarding the treatment of cases.

A. *In the centres.* In order to decide the best line of treatment not only should the lymph and blood be examined, but a lumbar puncture should also be made.

i. *Patients in the first stage without nervous lesion.* Give orsanine (Fourneau 270) or atoxyl alone or with emetic. Arsenic resistance or a relapse is an indication for Bayer 205 (Fourneau 309). Treatment should be prolonged for 6 to 12 weeks, and a lumbar puncture made a year after the end of treatment.

ii. *Patients in the meningeal stage.* Orsanine or tryparsamide should be used, the latter by preference if the changes in the spinal fluid are marked. If there is also a peripheral infection orsanine or atoxyl should be added to the tryparsamide. There is no hard and fast rule regarding the duration or total dosage to be given in this stage, or regarding the exclusive use of any particular medicament. The patient must be kept under medical control, frequent blood examinations made and repeated spinal punctures.

B. *In the bush.* The procedure should approximate as closely as possible to that of the hospitals and centres.

i. When lumbar puncture is possible.

(a) *Cerebrospinal fluid normal.* Orsanine 10 to 12 injections in gradually increasing doses of 2 cgm. to 2·5 cgm. per kilo. to a maximum of 2 gm. Or six injections of atoxyl (1 cgm. to 2 cgm. per kilo. with a maximum dose of 1 gm.) at intervals of at least a week.

(b) *Cerebrospinal fluid pathological.* Tryparsamide 12 injections at weekly intervals : the first injection not exceeding 1 gm., the second 2 gm. and the remainder 3 gm. These should be preceded by one or more sterilizing injections of small amounts of orsanine or atoxyl.

ii. When lumbar puncture has not been possible.

(a) *Patients recently infected.* Atoxyl 6 injections of 1·5 cgm. per kilo. with a maximum dose of 1 gm. This should be followed by 6 injections of tryparsamide.

(b) *Patients in which the infection is clinically obvious, and in whom parasites are not found in the blood.* One injection of atoxyl, then 12 injections of tryparsamide at weekly intervals.

(c) *Patients previously treated and still with trypanosomes in the blood.* Three injections of Fourneau 309, or in case or contra-indication emetic. Then 12 injections of tryparsamide at weekly intervals.

There then follow certain recommendations of a general nature against infection, e.g. removal of villages, clearing, creation of segregation villages, improvement of diet, etc.

W. Y.

LEGER (M.). La classification classique de 1re période sanguine et de 2e période méningée, dans la trypanosomiase est-elle justifiée? [**Are we Justified in dividing Trypanosomiasis into First and Second Stages?**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. p. 833.

In sleeping sickness, as in syphilis, meningeal involvement sometimes occurs with extraordinary rapidity, in other cases it is greatly delayed, and in still others it never occurs. The author believes that instead of speaking

of first and second periods it is better to refer to lymphatic localizations, blood localizations, meningeal localizations, and cerebral localizations.

W. Y.

Bourguel (A.). La ponction lombaire en brousse, dans les secteurs de prophylaxie de la maladie du sommeil en A.E.F. [**Lumbar Puncture in the Bush in French Equatorial Africa.**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 826–828.

The author describes the technique of lumbar puncture as practised by him in the bush on 7,000 cases of sleeping sickness during a sojourn of two years in Moyen-Congo.

A guard is sent on 24 hours in advance and finds the inhabitants already assembled, as they have been warned by a runner. The guard then builds a suitable shelter properly orientated and protected from the wind; this is constructed of green wood, of grass, and of fresh leaves. The ground is watered and covered by banana leaves.

The method of sterilization of the instruments and skin is described. The author states that he has under these conditions made as many as 100 punctures in a day—a procedure which is rather fatiguing when it is remembered that the material has to be examined. He has never had an ill result. The native accepts the situation readily, and frequently believes that it is a method of treatment and not one of diagnosis.

W. Y.

Barrett (R. E.). **On the Question of Immunity in Infants to Human Trypanosomiasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 191–195. [3 refs.]

Between July, 1928, and August, 1930, over 2,000 cases of sleeping sickness were recorded in the West Nile District of Uganda. Amongst these cases there was not a single instance of an infantile infection. No young children below an age estimated to be about 3 were found to be infected with sleeping sickness. A review of some 900 cases in the East and West Madi sleeping sickness area recorded between 1919 and 1930 revealed precisely the same state of affairs, viz., the absence of sleeping sickness amongst infants. The author considers in some detail the explanation of this apparent fact and offers the suggestion that the malaria from which young children suffer to such a pronounced degree may be the explanation. His summary is as follows:

"It is tentatively suggested that a possible explanation of the absence of sleeping sickness amongst infantile populations of the West Nile and Madi Districts of Uganda and elsewhere may be the acute and recurring attacks of malaria sustained in infancy in endemic areas, and not ceasing until the development of malarial immunity between the third and fourth years of life. As this immunity develops so, it is suggested, does susceptibility to sleeping sickness increase."

[See, however, Aitken, below.] W. Y.

Saunders (G. F. T.). **The Adhesion Phenomenon in Trypanosomiasis.**—*West African Med. Jl.* Lagos. 1931. Oct. Vol. 5. No. 2. pp. 28–31. [4 refs.]

The work of Davis and Brown, and of Johnson and Lester, having apparently shown the adhesion test to be of sufficient specificity

and accuracy to justify its use in the diagnosis of obscure cases of human trypanosomiasis, the authors decided to employ the test for this purpose at Yeji on the Volta River in the Gold Coast. The following summary is given :—

" 1. When virulent strains of trypanosomes are used 91 per cent. of proved cases of trypanosomiasis show some degree of adhesion, while 75 per cent. of cases not proved to be trypanosomiasis give completely negative reactions.

" 2. The false positives may be non-specific reaction, may be due to sub-infective inoculations, or to mild or relapsing infections.

" 3. Feeble relapsing strains of trypanosomes are not reliable for the test."

W. Y.

Sicé (A.) & Leger (Marcel). Note complémentaire sur le début de l'évolution nerveuse de la trypanosomiase humaine. [**Onset of Nervous Lesions in Human Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 828–832. [8 refs.]

Reference is made to a previous paper by Sicé [this *Bulletin*, Vol. 27, p. 819] in which it was shown that the first manifestation of meningeal reaction may appear very quickly in the disease. The authors point out that although it is often impossible to determine in the African the period which elapses between the date of infection and the commencement of meningeal lesions, the same does not apply in the case of Europeans in whom careful interrogation will usually suffice to determine the date of the first symptoms.

In the present paper details are given of 6 cases of sleeping sickness, in all of which lumbar puncture before the end of the first year showed that the cerebrospinal fluid was no longer normal. In two of the cases the changes were marked at the 9th and 10th month respectively. Long before the appearance of the trypanosome in the sub-arachoid space, and most frequently before any clinical manifestation of nervous lesions, the meninges have lost their integrity and the nervous centres are attacked. The meningo-encephalitis evolves silently, and will only reveal itself clinically some months later. For some years human trypanosomiasis is especially a disease of the central nervous system ; the invasion of the blood and lymphatic system is only a brief stage.

W. Y.

Aitken (Isobel M. Malcolm). **A Clinical Note on Two Cases of Trypanosomiasis in Infants.**—*West African Med. Jl.* Lagos. 1931. July. Vol. 5. No. 1. pp. 13–14.

Details are given of two cases of trypanosomiasis in infants six weeks and two weeks old respectively. The author states what she considers to be the main points of interest in the following summary :—

" (1) The possibility of the occurrence of trypanosomiasis in very young infants, without clinical symptoms suggestive of the disease, and in districts very widely separated from each other.

" (2) The necessity for a routine examination of blood by the thick film method in all cases admitted to a children's hospital. In neither of the two cases recorded would trypanosomiasis have been diagnosable from the clinical symptoms.

" (3) The value of Bayer 205 in clearing up the blood of early cases in a very short time.

" (4) The absence of trypanosomes in the blood of either mother, thus probably ruling out a congenital origin, as was found in the cases described by Kellersberger (*Trop. Dis. Bull.*, Vol. xxiii, p. 51) and Mühlens (*Ibid.* Vol. xxvi, p. 702).

" (5) The similarity of ' origin ' of Case (2) to that of Graf's case with a history of a ' boil.' (*Trop. Dis. Bull.*, Vol. xxvi, p. 703). Unfortunately in Case (2) the discharge from the boil was not examined for trypanosomes.

" (6) The apparent contradiction of Ficher's statement (*Trop. Dis. Bull.*, Vol. xxiii, p. 53) that the treatment of young children is unsatisfactory because of the difficulty of finding the correct doses of the medicinal substance used in treatment, since Case (1) had still remained free from symptoms of trypanosomiasis for six months after treatment."

W. Y.

McLean (N.). **The Incubation Period of Sleeping Sickness illustrated by Two Cases of Trypanosomiasis among Europeans.**—*Kenya & East African Med. Jl.* 1931. Nov. Vol. 8. No. 8. pp. 235–236.

Details are given of two Europeans who contracted sleeping sickness in January, 1929, while on safari in the Kuja River zone of South Kavirondo. The cases are of interest in that they throw some light on the incubation period of the disease. The following are the conclusions :—

" (*a*) The incubation period of trypanosomiasis is less than fourteen days. Circumstances in the above cases would strongly suggest that seven days is an accurate figure.

" (*b*) From the time of being bitten by an infected fly until the appearance of trypanosomes in the peripheral blood is probably about twenty-one days. In the case of Mr. X there is a possibility that novarsenobillon delayed the appearance of trypanosomes.

" (*c*) The local irritation around the bite of the infected tsetse supports Manson's original observation on this phenomenon."

W. Y.

Martin (R.) & Monier (H. M.). Sur un cas de trypanosomiase humaine. [**Case of Human Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 657–660.

A detailed account is given of a case of human trypanosomiasis which, in the authors' opinion, affords a good example of the dangers which attend the treatment of this disease by insufficient doses of tryparsamide.

The patient, aged 44, had lived for 20 years in Gabon ; in June, 1930, trypanosomes were found in his blood. He was given 15 intravenous injections of tryparsamide in doses not exceeding 0·04 gm. per kilo. : the maximum dose injected was 2·4 gm. On November 3rd, trypanosomes were again found in the blood and between November 9th, 1930, and January 22nd, 1931, he was given 12 more injections of tryparsamide increasing in doses from 0·02 gm. to 0·055 gm. per kilo. From the eighth injection the dose was 3·263 gm. The patient then returned to France and was seen by the authors on February 18th, 1931. He exhibited characteristic glands, a quotidian fever not influenced by quinine, deep hyperaesthesia, headaches, insomnia, mental instability, loss of memory, and slow speech. Trypanosomes were present in the blood. Spinal puncture showed lymphocytes 6·4 per cmm., albumen 0·32 per cent. and chlorides 7·25 per cent.

On February 26th, the patient, who now weighed 64·9 kilo., was given 0·298 gm. of Fourneau 270 [acetyl *p* amino-*o*-oxyphenyl-arsenic acid] and a week later, as this preliminary dose had been well tolerated, a maximum dose of 2·25 gm. Examination of the blood still showed trypanosomes. On March 13th a third injection of 2·25 gm. of Fourneau 270 was given intravenously. Trypanosomes disappeared from the blood and the patient seemed to be much better. In all, 10 injections of Fourneau 270 were given. Between March 26th and May 1st, 1930, several thick preparations of the blood were examined daily ; in all 89 slides were examined and 12 were found to be positive.

As, notwithstanding the general improvement in the patient's condition, he was still infected, emetic was given. On September 7th, the condition was good, the weight 68·5 kilo., the fever had gone, and the speech was quicker. Spinal puncture showed 4·8 lymphocytes per cmm. and 0·29 per cent. of albumen.

The authors believe that, as the result of the first series of small doses of tryparsamide, the trypanosomes had become arsenic fast, so that the second series of larger doses, which reached as much as 3·6 gm. per injection, and the subsequent larger doses of Fourneau 270 failed to sterilize the infection.

W. Y.

Blanchard (M.). Remarques sur la trypanosomiase d'un Européen. [**Case of Trypanosomiasis in a European.**]—*Marseille Méd.* 1931. June 25. Vol. 68. No. 18. pp. 818–820.

The patient—a European 55 years old—had spent 3 years in Chad in a region free from sleeping sickness. He had not had a single day's illness. On his journey home to France all went well until the boat reached the mouth of the Likouala when he was bitten on the left leg. There appeared a little ecchymosis which increased day by day until by June 8th, 1930, it had attained the size of a 5 franc piece : the lesion was painless. On June 9th he passed the routine medical examination to which all who wish to leave the Congo are subjected, and was declared free from trypanosomiasis. The following day, June 10th, he had a violent attack of fever and became very somnolent. A diagnosis of malaria was made and quinine given. The fever remained high, however, and the patient was prostrated and somnolent. He then complained of an enlarged inguinal gland on the left side. A blood film was examined and " very numerous trypanosomes " seen. Treatment was commenced with three injections of 270 Fourneau, but as these were followed by marked oedema of the legs the drug was stopped and tryparsamide and emetic substituted. The three doses of 270 Fourneau caused all the trypanosomiasis symptoms to disappear rapidly. The patient is now apparently cured.

The interesting points about the case are : The demonstration of the exact incubation period, viz., 10 days ; the local lesion produced by the infective bite ; the intensity of the blood infection ; the marked somnolence ; and the intolerance to 270 Fourneau which, according to Vaucel, is frequent amongst Europeans.

W. Y.

Walravens. Influence de la trypanosomiase humaine sur la glycemie. Notes cliniques. [**Influence of Human Trypanosomiasis on Glycaemia. Clinical Notes.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. June 31. Vol. 11. No. 2. pp. 213–218. [Bact. Lab., Elisabethville.]

The author estimated the amount of blood sugar in 12 cases of sleeping sickness, before, during, and after treatment. In all, try-

panosomes were found before treatment by gland puncture, and in 6 of them also in the blood: all patients were apparently cured by the course of treatment. No definite variations were observed in the blood sugar titre before, during, and after treatment. In two of the patients the titre was very low before treatment, viz., 15 cgm. and 23 cgm. per titre respectively. One of these had a profoundly altered spinal fluid, but that of the other was practically normal. Treatment did not cause any marked alteration in the blood sugar titre, although the patients were cured of the disease. In the course of his work on human trypanosomiasis the author has encountered two cases of special interest.

The first patient when seen was in a critical state with trypanosomes in the glands and a profoundly altered spinal fluid containing very numerous lymphocytes (1050 per cmm.). On April 24th, 1924, a course of treatment was commenced consisting in all of Bayer 205 5 gm., atoxyl 10 gm., and emetic 1 gm. After this course of treatment on December 24th, the spinal fluid contained only 50 lymphocytes per cmm. In February, 1925, the number of lymphocytes had increased to 192. The patient was then given 5 injections, each of 3 gm. of tryparsamide. He disappeared but was seen again 5 years later when a lumbar puncture showed a normal spinal fluid.

The second case, a woman with positive glands and negative blood, was given 39 gm. of tryparsamide in 11 injections of which 7 consisted of 4 gm. doses. A month after the end of treatment the glands and blood were positive. A white rat was injected with the blood. The patient then received a course of Bayer and emetic and was cured. There was no relapse and the spinal fluid was negative. The white rat 15 days after inoculation showed trypanosomes in the blood. It was cured with tryparsamide. The author concludes from this that the trypanosome was not arsenic-resistant and the failure of tryparsamide to effect a cure in this case could not be explained on this hypothesis. [Before any weight could be attached to this contention more information is required. How much tryparsamide was necessary to cure the rat and how did this compare with the amount necessary to cure rats infected with other strains from man in the district in question?]

W. Y.

Vaucel (M.) & Boisseau (R.). Résultats éloignés du traitement de la trypanosomiase humaine à forme méningée par la tryparsamide. [**Ultimate Results of Tryparsamide Treatment of Meningeal Trypanosomiasis.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 528–530. [3 refs.] [Pasteur Inst., Brazzaville.]

In the following table the authors summarize the condition in 1931 of sleeping sickness patients treated with tryparsamide at Brazzaville in 1925–1926.

The conclusions are :—

1. Tryparsamide gives rise to definite cure in a large number of patients.
2. The results of tryparsamide are "all or nothing." The return of the cerebrospinal fluid to normal after a continued treatment amounting to at least 0·4 gm. per kilo. of body weight is generally definitive.
3. When a check is experienced—relapse or even simple amelioration—the prognosis is grave, and generally fatal.
4. When treated by tryparsamide, properly observed and controlled, human trypanosomiasis in the meningeal stage appears now to be an affection of the nervous system capable of easy and beneficial modification.

Patients treated in 1925–1926.		Results obtained in 1931.				
		Successes.	Ameliorations.	Relapses (L.C.R.)	Deaths.	Disappearance.
1st period ...	16 successes ...	13	—	—	—	3 (good condition)
2nd period at the beginning	30 successes ...	11	1	—	—	18 (good condition)
	1 doubtful ...	—	—	—	1	—
	2 checks	—	—	—	—	2 (bad condition)
2nd period later on	51 successes ...	29	2	1	1	18 (good condition)
	2 ameliorations ...	—	—	—	—	2
	9 relapses ...	3	—	—	4	2 (bad condition)
2nd period advanced	47 successes ...	26	—	—	—	21 (good condition)
	10 ameliorations ...	3	1	—	2	4
	22 relapses ...	2	—	—	15	5 (bad condition)
2nd period terminal	6 successes ...	5	—	—	—	1
	1 amelioration ...	—	—	—	—	1 (bad condition)
	2 checks	—	—	—	1	1 (bad condition)
Total	199 patients ...	92	4	1	24	78
		121 patients				

W. Y.

Muraz (M.). Le traitement standard de la maladie du sommeil. [**Standard Treatment of Sleeping Sickness.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 530–535.

In this short article the author summarizes the work which is now being undertaken in an attempt to combat sleeping sickness in French Equatorial Africa.

Three main measures have been recently adopted, viz., increase in the medical staff, formation of 28 centres for prophylaxis, and creation of 60 centres for treatment, where the patients are given a "standard-cure" consisting annually of 12 injections of "Fourneau 270" (orsanine), or of tryparsamide after diagnosis by lumbar puncture.

The activities of the staff are summarized in a table in which is shown the number of natives examined, the number of lumbar punctures made, the number of injections given, etc. The figures are enormous.

Two types of treatment are in operation, the first in the towns and the second in the bush. In the former the treatment is carefully controlled and new drugs are tested; in the second the standard treatment of 12 injections annually is given. The reasons in favour of such a

standard treatment are discussed in some detail. The question of expense is an important consideration. The standard treatment consists always of " 270 Fourneau " for patients in the first stage of the disease, and of tryparsamide for those of the second stage ; the latter treatment is always preceded by a sterilizing injection of atoxyl.

W. Y.

VAUCEL (M.) & SALAÜN (G.). Thérapeutique et prophylaxie de la trypanosomiase en A.E.F. (A propos du " traitement standard " de la maladie du sommeil.) [**Treatment and Prophylaxis of Trypanosomiasis in French Equatorial Africa.**]—*Bull. Soc. Path. Exot.* 1931. Nov. 12. Vol. 24. No. 9. pp. 834–839. [Pasteur Inst., Brazzaville.]

This paper is a criticism of the application of the standard method of treatment of sleeping sickness in French Equatorial Africa advocated by MURAZ and others. MURAZ differentiates between patients treated at Brazzaville and those treated in the bush. The authors point out that the difference is more apparent than real. The cases of unlimited treatment referred to by MURAZ are rare. It is true that at the Brazzaville centre some patients have remained for several years, but they are either incurables and abandoned by their families, or they are patients treated with new compounds kept under observation without further treatment. As a rule, the patients are not kept long at Brazzaville on actual treatment, and it is only the individuals in a bad state who remain more than a year. In the majority of cases 12 injections of tryparsamide suffice to restore the cerebrospinal fluid to a normal condition. The results of treating cases between January and October, 1931, are as follows :—

1. Patients in the second stage, 1st degree (hyperlymphocytosis) :—
   100 per cent. successes with 12 injections.
2. Patients in the second stage, 2nd degree (hyperlymphocytosis and hyperalbuminosis) :—
   47 per cent. successes with 12 injections,
   85 per cent. successes with more than 12 injections,
   15 per cent. of checks or ameliorations.

When a case is diagnosed early, the standard method gives excellent results, but if the meningeal lesions are more advanced failures are much more frequent. In such cases it is therefore dangerous to limit the course to the 12 injections prescribed in the standard treatment.

The authors discuss in detail the administrative difficulties of applying their method of treatment not only at Brazzaville, but in the other centres of treatment. The natives, it is true, rebel against existence at a treatment centre, and their detention there undoubtedly is a heavy charge on the sanitation budget. It is for this reason that the authors have encouraged the dispensary system, which works perfectly at Brazzaville. Many patients come up each week from places several hours distant, whilst others reside with friends in the neighbourhood of the dispensary.

A course of the arsenical 270 Fourneau is considered by the authors to be the ideal treatment of patients in the first stage of the disease.

It combines the advantages of a prophylactic, in that it gives a minimum of blood relapses, with those of a curative, in that it is followed by a minimum of ultimate nervous evolutions.

Whilst there is no doubt that cases of sleeping sickness have been cured by two injections, or even by a single injection, of an arsenical, this does not justify the wholesale employment of such methods. Formerly, when in French Equatorial Africa the prophylactic course consisted of two injections of atoxyl the relapse rate was 29 per cent. annually. Now that the course consists of six injections, the blood relapses during the first year amount to only 6 to 10 per cent. ; to these must be added 25 per cent. in whom nervous lesions develop, notwithstanding the fact that lumbar puncture had shown them to be free from such lesions at the beginning of treatment. There remain, however, 70 per cent. of definite cures as the result of a course of six injections of atoxyl, and such, if one excludes Fourneau 270, still remains the best method of prophylactic treatment.

On the contrary, however, the examination of the cerebrospinal fluid, after the administrations of 12 injections of tryparsamide to patients in the second stage of the disease, shows that although this treatment is often efficacious and sufficient, nevertheless it must be prolonged in certain cases in order to protect the patient from later relapses. It is apparently in this respect particularly that the standard treatment fails.

W. Y.

Sicé (A.). A propos de quelques échecs de l'action trypanocide des composés arsenicaux. [**Failures of Trypanocidal Action of Arsenicals.**]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 660–663. [4 refs.]

The author comments on the fact that although in the great majority of cases of sleeping sickness certain organic arsenicals exert a most definite trypanocidal action, yet in a relatively few cases their use proves unsatisfactory. Details are given of four such cases, none of whom had had any previous treatment prior to their diagnosis and treatment at the Pasteur Institute at Brazzaville.

Case 1. Diagnosed December 27th, 1927. Blood positive ; cerebrospinal fluid cells 11, albumen 0·15 per cent. From December 27th, 1927, to March 21st, 1928, given a course of tryparsamide totalling 18·4 gm. On May 1st, 1928, there was a blood relapse. From May 1st to August 24th orsanine (22·7 gm.) was given. On September 28th there was a second relapse. From this date until January 25th, 1929, a second course of orsanine (26·3 gm.) was given. On May 31st there was another blood relapse. From May 31st until August 23rd, etharsanol (19·55 gm.) was administered. There was a fourth blood relapse on December 6th. The cerebrospinal fluid was unchanged. From December 1st, 1929, until February 14th, 1930, another course of orsanine was given. On April 11th, 1930, there was a fifth blood relapse. At this point arsenicals were abandoned and emetic tried, but as the patient disappeared the result is unknown.

Case 2. Diagnosed February 15th, 1927. Blood positive ; cerebrospinal fluid, cells 4, albumen 0·2 per cent. From February 17th to March 24th orsanine (11·9 gm.) was given. On April 4th there was a blood relapse. From April 9th to May 9th, weekly doses of atoxyl were given (4·8 gm.). On June 1st there was a second blood relapse. From June 8th

to July 27th weekly doses of emetic given (0·71 gm.). On September 14th there was a third relapse. From September 14th, to October 19th a course of moranyl was given orally ; the total amount was 15 gm. there were no renal manifestations. On December 21st there was a fourth relapse. The patient was kept under observation until February 22nd, 1928, without treatment ; blood examinations sometimes revealed the presence of trypanosomes and sometimes were negative ; the condition of the spinal fluid was unchanged. From February 22nd until May 17th a course of tryparsamide (19·8 gm.) was given. He disappeared on November 2nd, a carrier of trypanosomes.

Case 3. Diagnosed August 2nd, 1927. Blood positive ; cerebrospinal fluid cells 64, albumen 0·22 per cent. From August 2nd until December 21st, weekly treatment of orsanine given (14·7 gm.). On December 21st a spinal puncture showed cells 7, albumen 0·2 per cent. On July 18th, trypanosomes were again found in the blood, the cerebrospinal fluid was unchanged and the general condition was good. A second course of orsanine (19 gm.) was given from July 18th to October 21st. On March 4th, 1930, although the blood remained negative the spinal fluid was gravely changed, cells 251, albumen 0·5 per cent., trypanosomes present. Tryparsamide was then given and on June 20th the spinal fluid was greatly improved. Treatment continues and the prognosis is very guarded.

Case 4. Diagnosis July 9th, 1928. Blood positive ; cerebrospinal fluid cells 6, albumen 0·2 per cent. From July 9th to October 10th orsanine (18·7 gm.) was given. On December 21st, trypanosomes reappeared in the blood and from this date until February 8th, 1929, weekly injections of atoxyl were given (8 gm.). Five months later, July 15th, the blood was positive, and spinal puncture gave evidence of commencing meningeal irritation. From July 15th, to October 21st etharsanol (15·9 gm.) was given. On February 3rd, 1930, trypanosomes were again found and the spinal fluid was normal. Between February 10th and March 21st the patient received 0·65 gm. of emetic and 4 gm. of atoxyl ; he then disappeared.

W. Y.

Dubois (A.). A propos de l'action antimutative du Bayer 205. [**The Antimutative Action of Bayer 205.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. June 31. Vol. 11. No. 2. pp. 131–138. [5 refs.] [School of Trop. Med., Brussels.]

The author has re-examined the question whether a subcurative dose of " Bayer 205 " will so change a trypanosomal infection in guineapigs as to make it curable by emetic or other antimonial preparation. In his first group of experiments a small dose of " Bayer 205 " was administered to the guineapigs at the time of infection with *T. congolense* ; when the blood showed parasites the antimonial was given. In the second group of experiments the infected guineapigs were treated with " Bayer 205," and subsequently when a relapse occurred with the antimonial. In neither group of experiments were cures obtained. It is consequently concluded that " Bayer 205 " does not exert any antimutative action on *T. congolense.*

Further experiments, however, showed that " Bayer 205 " exerted a definite antimutative action on the much more sensitive *T. pecaudi* in that guineapigs, which had relapsed with this infection after treatment with small doses of " Bayer 205 " were cured by what were normally inefficacious doses of antimony.

W. Y.

Levaditi (C.), Bardet (J.), Tchakirian (A.) & Vaisman (A.). Propriétés thérapeutiques de l'indium dans les trypanosomiases et la syphilis expérimentale. [**Indium in the Treatment of Trypanosomiasis and Spirochaetosis.**]—*C.R. Acad. Sci.* 1932. Jan. 18. Vol. 194. No. 3. pp. 325–327. [1 ref.]

The authors have studied the preventive and curative action of tartrate of indium in trypanosomiasis, relapsing fever, spirillosis of fowls, and experimental syphilis of the rabbit. A solution of the drug, 0·0157 gm. per cc., was made and given subcutaneously. A mouse of 20 gm. tolerated a dose of 0·0015 gm. Indium is hence about 10 times as toxic as gallium. The results of the experiments showed that indium is about as active as gallium, and that it is to be placed among the elements therapeutically active in certain trypanosomiases and in experimental syphilis. Its preventive and curative actions are satisfactory in mice infected with *T. evansi*, but they are inconstant in experimental syphilis of the rabbit.

W. Y.

von Jancsó (N.). Photobiologische Studien in der Chemotherapie. I. Lichtempfindliche Trypanosomen in trypaflavinbehandelten Tieren. II. Photodynamisches und therapeutisches Interferenzphänomen bei der experimentellen Naganainfektion. [**I. Light-Sensitive Trypanosomes in Animals treated with Acriflavin. II. Photodynamic and Therapeutic Interference Phenomenon in Experimental Nagana Infection.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Oct. 1. Vol. 122. No. 4/5. pp. 388–392. With 1 text fig. [7 refs.]; 393–400. With 1 text fig. [10 refs.] [Reich Health Office, Berlin-Dahlem.]

I. Reference is made to the work of Raab (1900), who showed that paramoecium would live in solutions of fluorescent substances, e.g., eosin, acridin, etc., in the dark, but died when exposed to light. Jancsó has now found that trypanosomes from animals treated with trypaflavine die rapidly when exposed to light.

The conclusions are as follows :—

1. The trypanosomes found in the body of nagana infected mice after treatment with trypaflavine were sensitive to light.
2. The light sensitivity was dependent on the fact that the parasites had taken up trypaflavine.
3. The sensitized trypanosomes were killed by those rays which are absorbed by trypaflavine. Passage through a trypaflavine filter renders the light inactive.
4. The photodynamic activity of trypaflavine is dependent on its fluorescence.
5. In view of the fact that the light-sensitive trypanosomes were also killed in a short time by dark background illumination, it was possible to work out a method to demonstrate the quantitative fixing of trypaflavine by the parasites.
6. The results show that trypanosomes in the blood of treated animals anchor trypaflavine.

II. The author has applied the methods and information discussed in his first paper to the problems of acriflavine resistance and the interference phenomena. Infected mice which had received a preliminary dose of 1/2000 solution of parafuchsin were given 7 to 9 hours later a dose of trypaflavine. On contrasting these mice with those

treated with trypaflavine alone, it was found that the therapeutic action of trypaflavine was much weakened or suppressed, and that the trypanosomes were less photosensitive. It thus appears that in some way the preliminary injection of parafuchsin had altered the trypanosomes so that they exhibit less tendency to take up parafuchsin.

W. Y.

von Jancsó (N.). Photobiologische Studien in der Chemotherapie. III. Therapeutische und photodynamische Festigung von Naganatrypanosomen durch systematische Behandlung mit Trypaflavin. [**Photobiological Studies in Chemotherapy. III. Therapeutic and Photodynamic Fastness of Nagana Trypanosomes through Systematic Treatment with Trypaflavin.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Dec. 15. Vol. 123. No. 3/4. pp. 129–140. With 3 text figs. [9 refs.] [Reich Health Office, Berlin-Dahlem.]

A distinct difference is manifest in the sensitiveness to light after trypaflavin injection between normal and trypaflavin-fast trypanosomes. After 9 or 10 subcurative injections of trypaflavin the drug-fast strain which resulted was found to be 40 to 60 times as resistant to the action of light as was the original strain. This fact is in all probability to be explained on the ground that the resistant trypanosomes had taken up much smaller quantities of the drug than had the normal parasites.

Just as is the case in therapeutic interference, so also in that of the trypaflavin-resistant strain, a definite relationship could be made out between therapeutic influence and the behaviour of the blepharoplast on dark-field illumination. In the normal strain treated by trypaflavin all the individual trypanosomes exhibited a lighting up of the blepharoplast within a few minutes; the phenomenon was entirely absent in trypanosomes of a completely fast strain. In strains of moderate resistance the blepharoplasts were only illuminated by maximum doses of trypaflavin and only then in a certain proportion of the individual trypanosomes. [These observations confirm the conclusions reached by the reviewer and his colleagues concerning the nature of drug-resistance (this *Bulletin*, Vol. 28, p. 910).]

W. Y.

Collier (W. A.). Versuche ueber den Einfluss der Bestrahlung auf Trypanosomen und Bakterien. [**Influence of Radiation on Trypanosomes.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1931. Sept. 15. Vol. 112. No. 4. pp. 724–731. With 2 text figs. [7 refs.] [Robert Koch Inst. for Infectious Diseases, Berlin.]

In the experiments described in this paper an Osram-Solarca Lamp was used which gives slight light and warmth and ultra violet rays qualitatively equivalent to sunlight. The exact technique employed must be consulted in the original by those interested. The action of the radiation on the pathogenicity of the trypanosomes is shown in a table. The incubation period was progressively increased as the exposure was increased from 5 to 20 seconds; when the exposure was longer than 20 seconds the trypanosomes were non-infective. After the exposure, the parasites were, however, as motile as previously, but subinoculation into mice did not produce infection.

Further experiments were undertaken to ascertain whether radiation

produced any changes in the antigen properties of the trypanosomes. These showed that in many cases this was actually the case and that the modifications thus produced remained unchanged over a period of three months.

W. Y.

YORKE (Warrington), MURGATROYD (Frederick) & HAWKING (Frank). **Studies in Chemotherapy. VI.—The Production of Resistant Strains by Exposure of Trypanosomes to Reduced Tryparsamide** *in vitro*.—*Ann. Trop. Med. & Parasit.* 1931. Dec. 31. Vol. 25. Nos. 3 & 4. pp. 521–544. [1 ref.]

In No. 5 of this series the authors showed that a normal strain of trypanosomes, in vitro in a nutrient medium, will rapidly absorb an organic trivalent arsenical in solution such as reduced tryparsamide, whereas a resistant strain of the same trypanosome is in these circumstances incapable of absorbing the drug [see this *Bulletin*, Vol. 28, p. 910].

This observation led them to enquire whether a single exposure in vitro of a normal strain of trypanosomes to a solution of reduced tryparsamide, or repeated exposures, each exposure alternating with the passage of the washed parasites through a normal mouse, would result in the production of a strain resistant to the drug. From the first series of experiments it became clear that a single exposure in vitro to any concentration of reduced tryparsamide does not enhance appreciably the resistance of the trypanosomes to the drug. A series of exposures alternating with passage through mice was then undertaken :—

" Two parallel series of experiments were conducted. In the first, the concentration of reduced tryparsamide was always 1 : 12,800,000, i.e., the highest concentration which failed to exert any harmful effect on the suspension of normal trypanosomes. In the second, the concentration of reduced tryparsamide was initially 1 : 800,000, but as the parasites developed resistance, this was correspondingly increased, so that the concentration of the drug was always maintained at the highest level which just failed to destroy all the parasites in the suspension.

" For the sake of simplicity we shall at first confine ourselves to a consideration of the second series of experiments . . . "

" The general technique employed in each experiment was the same as that already described. A heavy suspension of trypanosomes obtained from one of the mice from a previous experiment was exposed *in vitro* for 1 hour at 37° C. to a solution of reduced tryparsamide in nutrient medium. The trypanosomes were then deposited by means of high speed centrifugalization, and after being washed four times in nutrient medium were injected into a group of four mice. When these mice became infected, the trypanosomes from one of them were used for the next experiment, and the degree of resistance of the infections in the other mice was tested by the administration of various doses of reduced tryparsamide."

The results are shown in twelve double tables, the data of which are analysed. The following is one of the conclusions drawn :—

" The speed with which resistance develops and the degree of its development depend on the concentration of the solution of reduced tryparsamide. When the concentration of reduced tryparsamide was the highest which could be employed without destroying any appreciable number of the trypanosomes (i.e., 1 : 12,800,000 in the conditions of the experiment, viz., time of exposure 1 hour at 37° C., number of trypanosomes 10,000 per 256 squares of the haemocytometer scale) no definite increase in resistance was observed until the eleventh exposure, and even after the thirty-sixth

exposure the resistance was increased only about twenty times. When, however, the concentration of reduced tryparsamide was the highest which could be employed without killing all the trypanosomes, i.e., 1 : 800,000 in the first four exposures and ever increasing concentrations in subsequent exposures, a considerable degree of resistance was observed after the fifth exposure, and, so far as could be judged from *in vivo* tests, complete resistance after the seventh exposure. Finally, a strain was produced which withstood a concentration of 1 : 6,250 reduced tryparsamide, and which more delicate tests shewed to be no less than 500 times as resistant as the original strain."

The summary is as follows :—

"1. A series of short exposures of a normal strain of *T. rhodesiense* to suitable solutions of reduced tryparsamide in nutrient medium—each exposure to the drug *in vitro* alternating with the passage of the washed parasites, through a normal mouse—sufficed to produce a strain highly resistant to the drug.

"2. An enhanced drug resistance was not immediately noticeable, but first made its appearance only after a number of exposures of the strain to the drug.

"3. The speed with which resistance developed, and the degree of its development, depended on the concentration of the solution of reduced tryparsamide to which the parasites were exposed.

"4. The optimum concentration of drug for this purpose was found to be the highest employed which failed to destroy all the trypanosomes in the suspension exposed to the drug. By this means a strain of trypanosomes was quickly produced which was at least 500 times as resistant to reduced tryparsamide as was the original strain ; it was also found to be exceedingly resistant to halarsol and stibenyl, but only slightly so to arsenophenylglycine, and not at all to Bayer 205. The use of lower concentrations of drug likewise sufficed for the production of a resistant strain of trypanosomes, but the process was much slower and the degree of resistance resulting was much less.

"5. The question was considered whether the development of drug resistance by a strain of trypanosomes is the result of a process of *selection*, i.e., the weeding out of the more sensitive individuals, and survival of those naturally resistant which tend always to reproduce their like ; or whether it is due to a process of *mutation*, i.e., a gradual change in all, or in certain, individuals resulting from the stimulus of frequent exposures of the strain to suitable concentrations of the drug, thus giving rise to the acquisition of a new character which is transmitted through innumerable subsequent generations.

"6. A critical analysis of the facts brought to light in these experiments indicates that the development of drug resistance by a trypanosome is fundamentally the result of a process of mutation, although the possibility cannot be excluded that under certain conditions the process of mutation may be aided by one of selection."

A. G. B.

Browning (C. H.), Cohen (J. B.), Cooper (K. E.) & Gulbransen (R.). **Therapeutic Interference caused by Isomerides of Trypanocidal Styryl Quinoline Derivatives.**—*Proc. Roy. Soc.* Ser. B. 1931. Sept. 1. Vol. 109. No. B760. pp. 51–57. [5 refs.] [Med. School, Leeds ; Path. Dept., Univ., & Western Infirmary, Glasgow.]

The following summary is given :—

"In the case of certain quarternary salts of styryl quinolines which possess active trypanocidal properties *in vivo*, e.g., 2 (*p*-amino styryl) 6 acetyl amino quinoline methosulphate, synthesis is effected by condensation in the presence of piperidine of the quarternary salt of the quinaldine

derivative with the aldehyde. The isomeride prepared by the addition of methyl sulphate subsequent to condensation of the aldehyde, using zinc chloride as the condensing agent, leads to a compound which is not a true quarternary salt but a loose molecular complex. The latter substance is much less effective as a trypanocidal agent; further, when administered along with the former, it produces therapeutic interference, on testing for trypanocidal action in mice infected with *T. brucei*. In the case of 2 (*p*-acetyl amino styryl) 6 amino quinoline methochloride, the second method leads to a mixture of the two isomerides which is deficient in trypanocidal action as compared with the quarternary salt prepared by the first method. Since the inactive isomeride may cause therapeutic interference when present in high dilutions along with the corresponding active compound, it appears in general that great care is therefore necessary in drawing conclusions as to the therapeutic efficacy of impure substances."

W. Y.

Quastel (Juda Hirsch). **Trypanocidal Action and Toxicity to Enzymes.** —*Biochem. Jl.* 1931. Vol. 25. No. 4. pp. 1121–1127. [2 refs.] [City Mental Hosp., Cardiff.]

The following is the summary :—

"1. Trypan-blue, trypan-red, and Bayer 205 are toxic to fumarase.

"2. The toxicity of six naphthylaminedisulphonic acids and their *s*-carbamide derivatives on fumarase has been investigated. It is shown that the free acids and their first *s*-carbamide derivatives are inert. Toxicity begins to be apparent with the second carbamide derivatives (*s*-carbamide of *m*-aminobenzoylnaphthylaminedisulphonic acid) and is very marked with third carbamide derivatives (*s*-carbamide of *m*-aminobenzoyl-*m*-aminobenzoylnaphthylaminedisulphonic acid). Attention is drawn to the parallelism which exists between this effect and trypanocidal action which begins only at the second *s*-carbamide stage of combination and is most marked at the third *s*-carbamide stage. The parallelism with the substantive properties of these derivatives to cotton is also discussed, and it is shown that there must be some structure in common between the fumarase enzyme, cotton fibre and the trypanosome which makes for specific combination or adsorption with the second and third *s*-carbamide derivatives of the naphthylaminedisulphonic acids. These derivatives are not toxic to urease.

"3. Derivatives of the 2-naphthylaminedisulphonic acids are much more toxic to fumarase than those of the *l*-naphthylaminedisulphonic acids.

"4. Fumarate 'protects' the enzyme, fumarase, from the toxic action of these derivatives.

"5. The presence of proteins diminishes or eliminates the toxic action of these derivatives."

W. Y.

Kapussto (M. L.). Zur Frage der Bedeutung der Immunkörper für den chemotherapeutischen Effekt. [**Significance of Immune Body for the Chemotherapeutic Effect.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Oct. 1. Vol. 122. No. 4/5. pp. 380–388. [16 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

Ehrlich reached the conclusion that besides the direct action of the chemotherapeutic agent on the parasite, antibodies played a significant part in determining the final result of treatment, and that sterilization of the infected organism was the result of a combined action of two factors: a direct action of the chemotherapeutic agent on the parasite,

and antibody which was formed by the host in response to the active antigen formed by the parasites destroyed by the drug.

After giving a summary of more recent work on this subject, the author passes to a consideration of his own work. He prepared a specific immune serum in the following manner. Rats at the height of infection with *T. equiperdum* were cured by a dose of salvarsan and 10 to 14 days later were bled to death : the blood of a number of animals was collected and the serum separated and deactivated at 56° C. for 30 minutes. A large number of mice were then infected with the same strain and treated as follows : The first group were treated with 0·4 to 1·0 cc. of immune serum alone ; the second group with a non-sterilizing dose of salvarsan and 0·4 to 1·0 cc. of immune serum ; and the third group with a non-sterilizing dose of salvarsan alone. The results of the experiments are set forth in a series of tables. No definite advantage was found from adding the immune serum to the drug, and the conclusion is reached that the action of antibodies in salvarsan therapy of trypanosome infections is only slight and inconstant.

W. Y.

Hasskó (A.). Experimentelle Untersuchungen über Misch- und Sekundärinfektion. II. Heilversuche bei mischinfizierten Tieren ; zugleich ein Beitrag zur Funktion des retikuloendothelialen Systems bei den chemotherapeutischen Heilungsvorgängen. [**Experimental Investigation on Mixed and Secondary Infections. II. Curative Experiments on Animals with Mixed Infections ; Function of the Reticulo-Endothelial System in Chemotherapeutic Curative Processes.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Dec. 15. Vol. 123. No. 3/4. pp. 140–150. [14 refs.] [Reich Health Office, Berlin-Dahlem.]

Although mixed infections in men and animals are of frequent occurrence, the question whether the curative action of chemotherapeutic substances is influenced under such conditions has not yet been settled. The only author who has conducted experiments on this subject is apparently Kawamura [this *Bulletin*, Vol. 28, p. 734]. He found that when mice infected with spirochaetes and trypanosomes were cured of the former infection by solganol, the latter developed rapidly and fatally ; whilst in doubly infected mice which remained untreated a long continued depression of the trypanosome infection was manifest.

The author decided to repeat and extend the work of Kawamura. He used white mice infected with various strains of relapsing fever spirochaetes and with *T. brucei*. The drugs employed were trypaflavin, germanin, emetic, salvarsan and a gold compound called " sulfoharnstoff." The experiments, which are recorded in detail, show that the trypanocidal action of the various chemotherapeutic substances is lessened in the mixed infections, in so far as doses which sterilized the mice infected only with trypanosomes produced merely a temporary disappearance of the trypanosomes in the mixed infections.

The author believes that the occurrence of relapses in the mice with mixed infections after the injection of normally sterilizing doses shows that the function of the reticulo-endothelium is damaged in the mixed infections. In support of this hypothesis he records an experiment in which 4 mice (2 healthy and 2 at the height of infection with

Sp. crocidurae) were injected with 1·5 mgm. of collosal gold. The mice were killed 30 mins. later and whilst the normal animals exhibited a heavy deposit of gold in the reticulo-endothelial cells of the liver and spleen, the spirochaete-infected animals showed mere traces. The spirochaetal infection exercises the same inhibitory action on the reticulo-endothelial cells as does electro-colloidal copper solution (v. Jancso, 1929–1931).

In the mice with mixed infections there is a severe injury to the reticulo-endothelium, the immuno-biological functions of which are responsible for the permanent cure, whilst the direct trypanocidal action of the drug remains unchanged.

W. Y.

Dubois (A.). Expériences préliminaires sur l'action trypanocide de diverses substances antimoniales nouvelles. [**Preliminary Experiments on the Trypanocidal Action of New Antimonials.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. Aug. 31. Vol. 11. No. 3. pp. 275–279. [1 ref.] [School of Trop. Med., Brussels.]

The research laboratories of the Union Chimique Belge sent to the author for trial certain antimony derivatives of quinoline; these are designated DN6, DN7, DN8, DN9 and DN10. All these products were tried on small laboratory animals infected with *T. pecaudi* and *T. congolense*. The results showed that they all had a definite trypanocidal action. DN9 was the least active. The preference should apparently go to DN8 and DN10.

W. Y.

Hu (C. H.). **The Lymphatic Reaction in Experimental Trypanosomiasis.** —*Nat. Med. Jl. China.* 1931. Aug.–Oct. Vol. 17. No. 4/5. pp. 435–457. With 14 figs. (2 coloured) on 7 plates. [14 refs.] [Path. Inst., Freiburg im Breisgau, & Peiping Union Med. College, Peking.]

The following are the summary and conclusions :—

"White rats experimentally infected with *Trypanosoma brucei* were studied histologically at different stages of infection. It was found that this infection produces a massive hyperplasia of the reticulo-endothelial system, increased intra- and extramedullary erythro- and myelopoiesis and a very striking hyperplasia of the lymphoid tissue. There is no evidence, however, to show that one element can be transformed into the other.

"The lymphatic hyperplasia, which takes place chiefly in the spleen and the lymph nodes, consists of a great increase in number of large and medium-sized lymphoblasts which, in the early stage of infection seem to be formed directly from certain small lymphoid cells in the lymphoid tissue of these organs. These lymphoblasts, once formed, may either undergo rapid cell division, forming other lymphoblasts, or transform into plasma cells.

"Although the lymphoblasts of the germinal centers and the rest of the lymphoid tissue participate in this generalized hyperplasia, the large and medium-sized lymphocytes and a certain number of the small lymphoid cells undergo no significant change. Especially striking are the small lymphoid cells of the thymus, all of which remain practically unaltered in the whole course of infection. The failure of these cells to take part in this reaction is interpreted by the assumption that they are true small mature lymphocytes which are, with the ordinary histological methods, indistinguishable from the small primitive cells capable of forming larger lymphoblasts. Investigations to substantiate this assumption by the use of supravital technic are now in progress."

W. Y.

LINTON (Richard W.) & POINDEXTER (H. A.). **Artificial Acidosis in *Trypanosoma lewisi* Infections, and its Bearing on the Pathogenic Action of *Trypanosoma equiperdum*.**—*Jl. Experim. Med.* 1931. Nov. 1. Vol. 54. No. 5. pp. 669–680. [7 refs.] [College of Physicians & Surgeons, Columbia Univ., New York.]

Reference is made to recent work which has shown that, in animals experimentally infected with trypanosomes, disturbances in the acid-base equilibrium of the blood are of fundamental significance in the pathogenic action of these organisms. It appeared to the author to be of interest to study the effect of an artificially induced acidosis upon infections of *T. lewisi*, thus reproducing for this organism a chemical environment in the blood somewhat similar to that in which other trypanosomes exhibit such a high degree of virulence. In the experiments described, the alkali reserve in rats was lowered by the intravenous injection of ammonium chloride in 2 per cent. solution. Varying amounts of this solution were given in doses of 0·25 cc. usually at intervals of 20 minutes, and the trypanosomes were counted at intervals during and after the course of injections. Dyspnoea was always present in the animals after two or three injections and was the chief symptom, although some animals showed considerable weakness. All recovered perfectly within a few hours of the last injection.

The following are the summary and conclusions :—

"When the alkali reserve is artificially lowered in rats infected with *Trypanosoma lewisi*, the number of parasites in the blood is increased. The increase is large in the early stages of the disease, and becomes less marked as the number crisis is approached. Near the crisis, and after it, a lowered alkali reserve does not affect the number of trypanosomes.

"It has been shown that the observed increase does not result from a contraction of the capillaries of the inner organs, which would throw a large number of trypanosomes into the peripheral circulation ; nor is the increase due to a greater reproductive activity on the part of the trypanosomes. The increase must, therefore, be due to an inhibition of the destructive forces of the host.

"It is suggested that the known production of organic acids by the pathogenic trypanosomes plays a similar rôle in inhibiting the destructive mechanism of the host, and is therefore of significance in the pathogenic activity of these organisms."

W. Y.

NATTAN-LARRIER (L.). La coloration des trypanosomes dans les coupes histologiques. [**Staining of Trypanosomes in Sections.**]—*Rev. Méd. et Hyg. Trop.* 1931. July–Aug. Vol. 23. No. 4. pp. 226–230. [4 refs.]

After referring to the technique used by the reviewer (1911) and by STEVENSON (1917) for the staining of trypanosomes in sections of infected tissues, the author passes to a description of the methods used by him in his study of *T. marocanum*, and especially on the question of its passage from the mother to the foetus. He recommends the following technique :—

The sections, which should be as thin as possible, are deparaffinated by toluene and then passed through the alcohols into water. After staining for 20 minutes in Kernschwartz they are washed thoroughly in water and stained by one of the following methods :—

(1) *Kernschwartz-Giemsa.* After staining in Kernschwartz, the section

is left for 10 to 20 hours in a dilute solution of Giemsa, prepared as follows :—

Methyl alcohol	1 cc.
Giemsa fluid	0·8 cc.
Sodium bicarbonate solution (5 per cent.)	1 drop
Distilled water	33 cc.

The section is differentiated in 90 per cent. alcohol, dehydrated in absolute alcohol, passed through toluene, and mounted in cedar oil.

(2) *Kernschwartz method of Laveran.* After staining with Kernschwartz, the section is stained for 10 to 20 minutes with a mixture of Borrel blue and eosin. This is made by adding one volume of Borrel blue to 9 volumes of distilled water and, immediately before use, one part of this dilute solution of Borrel blue is mixed with 2 parts of a 1 in 10 solution of eosin.

In other methods thionine blue and haemalum eosin are used as the counter stains. All four techniques give good results, although the authors give the preference to the first two methods.

Stress is laid on the importance of good fixation. Small pieces of tissue should be fixed in saturated sublimate or in acetic sublimate. The author also believes that Flemming solution, Bouin solution, and Dubosq and Brasil solutions would give excellent results.

W. Y.

v. Brand (Th.) & Regendanz (P.). Ueber Störungen des Kohlenhydratstoffwechsels bei der Trypanosomiasis des Kaninchens. [**Disturbance of Carbohydrate Metabolism in Trypanosomiasis of the Rabbit.**]—*Biochem. Ztschr.* 1931. Nov. 27. Vol. 242. No. 4/6. pp. 451–468. [19 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The following are the conclusions :—

In the course of *T. brucei* infections in rabbits a pronounced hypoglycaemia is met with in the very last (agonal) stage and a less marked hypoglycaemia in the stage (terminal) immediately preceding this ; the condition is not related to the consumption of sugar by the parasites.

In rabbits which have died of the infection, the glycogen content of the liver and muscles is greatly diminished, whilst in the terminal stage the decrease of glycogen is not so pronounced.

On the other hand, in the course of the infection a disturbance of the glycogen storage of the liver is demonstrable if the infected animals are given large amounts of cane sugar ; this can proceed so far that notwithstanding the administration of 25 gm. of sugar per kilo. of body weight in 24 hours no glycogen is stored in the liver. The glycogen content of the muscles is likewise decreased.

There is no relationship between the capacity to store glycogen and the height of the blood sugar.

Since the administered sugar is absorbed there must be a disturbance of the glycogen-forming function.

Notwithstanding the administration of much sugar the blood sugar content may fall in the terminal stage of the infection.

The cause of the disturbance of metabolism is to be sought in a poisonous action of the trypanosomes on the organs in question or on their regulation mechanism.

W. Y.

Corson (J. F.). **A Note on Experimental Infection of Guinea-Fowl and Francolin with** *Trypanosoma rhodesiense.*—*Jl. Trop. Med. & Hyg.* 1931. May 15. Vol. 34. No. 10. p. 133.

A guinea-fowl and three francolins caught at Maswa, Tanganyika, were injected in the leg muscles with *T. rhodesiense*, and subinoculations of their blood were made subsequently into white rats. The guinea-fowl and one francolin transmitted the infection ; details are given in a short table.

W. Y.

Ledentu (G.). Groupes sanguins et *Trypanosoma gambiense.* [**Blood Groups and** *T. gambiense.*]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 664–667.

It has been known for a long time that human serum presents great variations in respect of its action on *T. gambiense.* The author has enquired whether these differences are in any way related to the blood groupings. In his experiments he used commercial serum of Groups II, III and IV and a fixed virus conserved in mice which killed in four days.

The agglutination power depended greatly on the sample. At ordinary temperatures the potent sera, i.e., those strongly agglutinating human erythrocytes, exhibited similarly a marked agglutinating action on the trypanosomes. The agglomeration was always immediate and considerable, so that isolated trypanosomes were very rare. With sera II and III the trypanosomes were paralysed in a few minutes ; with serum IV their motility persisted for half an hour notwithstanding a good and rapid agglutination.

The author then passes to a consideration of protective and curative power of the various types of serum for *T. gambiense* infections of mice. His conclusions are :—

The sera of the Groups II, III and IV can be classified in this order of descending power in so far as the activity against *T. gambiense* is concerned.

Group II appears to be especially endowed with protective properties which are by no means negligible in the case of active samples.

It would be of interest to attempt to correlate these experimental facts with the incidence of human trypanosomiasis amongst the natives of Africa.

W. Y.

Schilling (Claus) & Borghi (Bruno). Die Bedeutung der Schleimhaut als Eintrittspforte bei Trypanosomeninfektionen. I. Mitteilung. [**Significance of Mucous Membrane as Portal of Entrance for Trypanosome Infections.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1932. Jan. 16. Vol. 113. No. 2 & 3. pp. 586–589.

White rats infected with *T. lewisi* were placed in a wire cage in a glass jar, the bottom of which was covered with sawdust. Fleas were then added from a dog. After 24 hours the infected rats were replaced by normal rats, and 4 days later it was possible to collect infected fleas from these with certainty. Such fleas were then ground up in the water of condensation from N.N.N. medium and the emulsion injected with the greatest care to prevent mechanical injury, into the mouths of normal rats : these animals showed *T. lewisi* in their blood 4 to 6 days later.

Attempts were then made to infect rats orally by the blood forms ; no success was obtained in 16 experiments. Six of these animals were then tested by the introduction of flea-forms of the trypanosome into the mouth, but in no instance was an infection obtained. Second attempts were made in three of these refractory rats, but these likewise failed. An attempt was then made to infect the animals by the injection of blood forms intraperitoneally. In one animal a regular infection occurred ; in a second an abortive infection, and the third animal was completely refractory. Other experiments were conducted along similar lines. In all, of 13 rats, into the mouths of which blood trypanosomes had been introduced, 11 (84·6 per cent.) proved refractory when attempts were made later to infect them by oral introduction of flea forms—a procedure which in normal rats gives 87 per cent. of infections. There thus appears no doubt that the insusceptibility for re-infection with flea forms, via the oral mucous membrane, is due to a development of active immunity. There is even evidence of immunity against the more virulent infection resulting from intraperitoneal injection of the blood forms. If this immunity is not complete, it is at least sufficient to result in the development of a mild infection.

Experiments were then conducted to ascertain whether the application of the blood forms of the pathogenic trypanosomes to the oral mucous membrane of rats would give rise to any immunization. These experiments show that even in the case of these infections there is evidence of the production of a feeble immunity when the trypanosomes are allowed to penetrate the undamaged mucous membrane.

W. Y.

Etinger-Tulczynska (R.). Nasale Infektion von Mäusen und Ratten mit Trypanosomen und Spirochäten. [**Nasal Infection of Mice and Rats with Trypanosomes and Spirochaetes.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1932. Jan. 16. Vol. 113. No. 2 & 3. pp. 590–596. [7 refs.] [Robert Koch Inst., Berlin.]

Experiments are recorded which show that mice are easily infected with *T. brucei* through the undamaged nasal mucous membrane by small numbers of parasites ; the incubation period is definitely longer than after injection. Rats are similarly easily infected ; in a proportion of the animals the infection assumes a chronic relapsing type. Further experiments showed that mice could be regularly infected with relapsing fever spirochaetes in the same way. In all cases it was far easier to infect through the nasal mucous membrane than through the mouth.

W. Y.

Nattan-Larrier (L.) & Noyer (B.). Voies d'introduction et activité des sérums anti-trypanosomes. [**Activity of Anti-Trypanosomal Serums according to Channel of Introduction.**]—*C.R. Soc. Biol.* 1931. Dec. 4. Vol. 108. No. 35. pp. 856–859.

Experiments are recorded which show that the curative and protective action of human serum in trypanosomal infections in mice is definitely greater when the serum is administered intravenously than when it is given subcutaneously or intraperitoneally.

Six mice were infected with *T. brucei* and five of them treated by an

intravenous injection of 1/10, 1/20, 1/40, 1/100, 1/200 cc. respectively of human serum; the sixth animal served as a control. The mice given 1/10 cc. and 1/50 cc. were definitely cured; the smaller doses generally caused only a temporary disappearance of parasites from the blood. It is remarked that 1 cc. of human serum when given subcutaneously never cured, a relapse always occurring. In order better to study the value of the three methods of administration, three lots of mice were given 1/100 cc. of human serum by the intravenous, subcutaneous and intraperitoneal routes respectively. Neither the subcutaneous nor the intraperitoneal injections sufficed to clear the blood of trypanosomes, but life was prolonged for 3 days by the intraperitoneal injections; the intravenous injections were followed by cures.

Similar experiments are recorded dealing with the protective action of human serum when given by each of the three routes. It was found that here again the intravenous routes gave much the best results. Other experiments showed the same facts to hold in the case of immune serum developed by rabbits against *T. marocanum* var. *cameli*.

W. Y.

Kligler (I. J.). **Susceptibility and Resistance to Trypanosome Infection. VIII.—*In vitro* Demonstration of Specific Agglutinating and Trypanolytic Antibodies in the Serum of Infected Guinea-Pigs.**—*Ann. Trop. Med. & Parasit.* 1931. Dec. 31. Vol. 25. Nos. 3 & 4. pp. 377–392. [10 refs.] [Dept. of Hyg. & Bact., Hebrew Univ., Jerusalem.]

The course of a trypanosome infection in guineapigs, rabbits, and higher animals is characterized by its intermittent character. Previous work by the author indicates that the mechanism of relapse, as well as that of resistance to re-infection, is associated with the cellular defences of the body. It has been shown that relapse can be brought about by exhaustion of the cellular defence by injection of olive oil into guineapigs and that splenectomy greatly lowers the resistance of rats to an infection [this *Bulletin*, Vol. 27, p. 240]. These findings, however, do not account for the sudden disappearance of trypanosomes in infected animals, more particularly in the guineapig.

The work of many authors has shown that following a trypanolytic crisis in guineapigs there is a specific lytic substance present in the serum. Massaglia (1907) showed that the serum of an animal which was slightly lytic before a crisis became strongly so afterwards. This was confirmed by Levaditi and Mutermilch (1909), who also found that a strain of trypanosomes could be rendered resistant to the serum *in vitro* by a few minutes contact with it. Levaditi and McIntosh (1910) repeated and confirmed these observations and were able to develop resistant strains by *in vitro* contact with immune serum. In these experiments most of the trypanosomes were killed, but a few remained, and these, when injected into mice, gave rise to strains which were resistant to the action of the particular immune serum. The process was interpreted as one of selection. Rosenthal (1913), however, postulates the presence in the serum of a substance, antagonistic to the lytic substance, which increases the resistance of trypanosomes to the action of the serum.

The author's previous attempts to demonstrate humoral antibodies either *in vivo* or *in vitro* have given negative or variable results. The recent work of the reviewer and his colleagues, who were able to demonstrate *in vitro* a pronounced trypanolytic effect of normal human serum

on certain pathogenic trypanosomes [this *Bulletin*, Vol. 27, p. 804] has prompted the author to reinvestigate the trypanolytic properties of guineapig and rat serum following a crisis.

The technique employed differed in some respects from that of the reviewer and his colleagues. The testing medium was a diluted serum consisting of five parts guineapig serum, three parts glycosal solution, and two parts phosphate buffer mixture, M/30 of pH 7·8. The tubes were incubated at 25° C. to 28° C. Under these conditions the trypanosomes remained viable and infectious for at least three days and the effect of the serum could be followed without difficulty.

"The usual procedure was as follows: 1·0 cc. of the serum-glycosal mixture was added to a series of tubes. To these were added, first, decreasing dilutions of the serum to be tested, and then equal amounts of a trypanosome suspension taken from an infected rat. The amount of trypanosome suspensions added was usually graded to give a final concentration of not more than 5,000 trypanosomes per cubic millimetre of medium. The suspension was then placed in the incubator and examined at stated intervals. In some experiments rats were infected after given periods in order to ascertain the infectivity of the treated trypanosomes."

Details of a considerable number of experiments are given. The conclusions are:—

"1. Serum of guineapigs infected with *Tr. evansi* contains trypanolytic substance, the concentration of which varies in different animals and in the different stages of the infection.

"2. The lytic effect is specific, affecting only some of the trypanosomes in a suspension. Even twenty-four hour contact of serum and trypanosomes fails to destroy all of the trypanosomes in suspension. The remaining trypanosomes are still virulent and resistant to the action of the serum. This resistance is lost after repeated passage in rats, the strains becoming once more susceptible to the lytic effect of the serum specific for the passage strain.

"3. In one experiment it was possible to obtain a mixed polyvalent serum which sterilized a suspension in twenty-four hours.

"4. No corresponding trypanolytic substance could be detected in sera of infected rats.

"5. As the infection progresses the lytic effect of the serum diminishes."

W. Y.

NATTAN-LARRIER (L.) & NOYER (B.). Ultrafiltration et action antitrypanosome du sérum humain. [**Ultrafiltration and Anti-trypanosomal Action of Human Serum.**]—*C.R. Soc. Biol.* 1931. Dec. 11. Vol. 108. No. 36. pp. 931–934. [2 refs.]

The authors show that when human serum is passed through an ultra-filter, the trypanocidal substance is carried through, but the alexine is retained. The filter, which consists essentially of a collodion membrane, is described elsewhere.* The filters have now been standardized and designated by the letter K followed by a number indicating the number of litres of water which in 24 hours traverses a membrane of 1 sq. metre under a pressure of 1 metre of water.

In preliminary work it was determined how the various filters dealt with alexine. K3000 under an aspiration of 10–15 cm. of Hg allowed all the alexine to pass in 15 mins.; K600 under an aspiration of 20 cc. of Hg for 2½ hours retained alexine completely as also did K250. Subsequent experiments were consequently all conducted with filters

* NATTAN-LARRIER and NOYER. *C.R. Soc. Biol.* 1930. Vol. 105, p. 630.

K600 and K250. They showed that such filters allowed the (trypanocidal) curative substance of human serum to pass through somewhat diminished in power; the protective action was more markedly lost.

The authors are inclined to the view that their experiments indicate that the curative power, and the protective power, of human serum are dependent on two substances which have not the same filterable index.

W. Y.

GILL (C. W. Hope). **The Specificity of the Kahn Test Unaffected in Human Trypanosomiasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Nov. 30. Vol. 25. No. 3. pp. 197–200. [3 refs.]

The object of the investigation was to determine whether the specificity of the Kahn test is affected in human trypanosomiasis. Two groups of sera were tested. Group A was drawn from Hausas at Gadao, the headquarters of the tsetse investigation in Nigeria. Group B was drawn from pagans of the Plateau Province, about 200 miles south of Gadao.

"*Group A*. Hausas attending the out-patient clinic at Gadau.

"*Series* 1. Sleeping sickness cases in which *T. gambiense* was demonstrated either in the gland juice or in thick blood films: Out of 39 sera, three were positive, and 36 (92·3 per cent.) were negative to the test.

"*Series* 2. General out-patients other than sleeping sickness cases (control series): Out of 36 sera, 15 were positive, and 21 (58·3 per cent.) were negative to the test.

"*Group B*. Pagans drawn from the Jaba and Kagoma tribes, Plateau Province.

"*Series* 3. Sleeping sickness cases in which *T. gambiense* was demonstrated by Dr. Paisley: Out of 204 sera, four were positive, and 200 (98·0 per cent.) were negative to the test.

"*Series* 4. Apparently healthy adult males and females selected at random from the general population (control series): Out of 110 sera, two were positive, and 108 (98·2 per cent.) were negative to the test.

"The percentage rate of sleeping sickness cases giving a positive Kahn test is therefore no higher than the syphilis rate of the controls. Yaws in this part of Nigeria is practically unknown.

"It is concluded that the specificity of the Kahn test is unaffected in human trypanosomiasis."

W. Y.

HASEGAWA (Kiichi). Experimentelle Studien ueber die Trypanosoma-Immunisierung. [**Experimental Studies in Trypanosome Immunization.**]—*Fukuoka-Ikwadaigaku-Zasshi.* 1930. Nov. Vol. 23. No. 11. [In Japanese. German summary pp. 85–88.] [Faculty of Med., Kyushu Imperial Univ., Fukuoka, Japan.]

The amount of antibody produced in response to the injection of heated trypanosome vaccine is, as a rule, less than that resulting from unheated vaccine. The influence of heat on agglomeratinin formation is greater than on agglutinin formation.

Rabbits were immunized with *T. gambiense* vaccine and 7 days later were either injected with *T. lewisi* vaccine or with *B. coli* vaccine or a 5 per cent., 10 per cent. or 15 per cent. solution of deutero-albumose. The experiments showed that the hetero-vaccine or the albumen increased the formation of agglomeratinins and to a less extent of the aggglutinins. The more closely related vaccine (*T. lewisi*) acted more potently than did the other injections.

The influence of salts of heavy metals on antibody formation was next examined. The chlorides of manganese, cobalt, nickel and zinc were

injected intravenously in 1/10 to 1/1,000 Mol. sol.). It was found that the agglomeratinin formation was stimulated by this means as to a less extent was also that of the agglutinins.

Finally, the result of feeding immunized rabbits on lipoids (cholesterin and lecithin) was examined. Whilst lipoid feeding for a short period had no influence on normal antibody formation, it had a specific effect on the immune body formation : cholesterin increases this and lecithin inhibited it. There was not found to be any relationship between the cholesterin content of the immune serum and its immune titre.

W. Y.

i. Hasegawa (Kiichi). Morphologische Untersuchungen ueber die Trypanosomen-Agglomeration. [**Morphological Investigations on Trypanosome Agglomeration.**]—*Fukuoka-Ikwadaigaku-Zasshi.* 1930. Dec. Vol. 23. No. 12. [In Japanese. German summary p. 89.]

ii. ——. Ueber den Einfluss der Komplemente auf die Agglomeration und Agglutination bei Trypanosomen-Immunisierung. [**The Influence of Complement on Agglomeration and Agglutination in Trypanosome Immunization.**]—*Ibid.* [In Japanese. German summary p. 90.]

iii. ——. Ueber die Isolierung der Agglomeratinine und Agglutinine nach der Castellanischen Absorptions-Methode. [**The Isolation of Agglomeratinin and Agglutinin by Castellani's Absorption Method.**]—*Ibid.* [In Japanese. German summary pp. 90–91.] [Kyushu Imperial Univ., Fukuoka, Japan.]

i. There are three types of agglomeration depending on the titre of the immune serum and its degree of dilution. Agglomeration due to sera of high titre takes place immediately and is marked ; this is the first form which assumes the appearances of a branch or rope. With sera of lower titre the second form is seen (glomerulus form) ; and with sera of low titre the third or rosette form. [Illustrations are given in the Japanese paper.] As the result of observations made with blepharoblastless trypanosomes produced by injections of pyronin, the author reaches the conclusion that this structure has no special significance on the mechanism of agglomeration.

ii. Trypanosome immune serum was mixed with various kinds of active complement—guineapig, sheep, hen, rabbits, etc.—and the influence on agglomeration and agglutination observed. The results showed that the active complement increased the agglutination reaction and caused a rise in the agglutination titre. The results varied somewhat according to the source of the complement. Complement exerted no influence on agglomeration.

iii. Agglomeratinin and agglutinin were isolated by Castellani's absorption method.

W. Y.

Fourche (J. A.) & Haveaux (G.). Germanine et tryponarsyl appliqués préventivement contre la trypanosomiase. [**Prevention of Trypanosomiasis by Germanin and Tryponarsyl.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 557–562.

The authors have repeated the observations of Fourche and Ricklin on the prophylactic value of " Bayer 205 " [this *Bulletin*, Vol. 26, p. 193]. The present observations were made at the end of 1929 and beginning of 1930 in the district of Babinji (Kasai).

The following are among the conclusions :—

We are more than ever persuaded of the preventive qualities of Germanin under the following conditions :

1. The preventive treatment ought to be given to the healthy whilst the infected are being treated.

2. The preventive treatment should be reserved for the healthy and all doubtful cases should be strictly excluded.
3. A minimum of 2 injections of germanin should be given.
4. The period of protection should not be considered to be longer than a maximum of 6 to 7 months.

It is possible that certain failures are due to the non-observance of one of these conditions.

The preventive action of tryponarsyl given in two successive doses is definitely shorter, but it is still manifest after six months.

W. Y.

Mesnil (F.). Trypanosomiases et maladie du sommeil. [**Trypanosomiasis and Sleeping Sickness.**]—*Bull. Acad. Méd.* 1931. Oct. 13. Year 95. 3rd Ser. Vol. 106. No. 31. pp. 199–207.

A general account of the disease which requires no special notice here.

W. Y.

Mazza (S.). Tatou porteur de germes de *T. cruzi*. [**The Armadillo as a Carrier of** *T. cruzi*.]—*Bull. Soc. Path. Exot.* 1931. Oct. 14. Vol. 24. No. 8. pp. 627–628. With 2 text figs.

The author points out that the tatou is apparently but little known in Europe: its real name is *Choetophractus vellerosus* and not *Dasypus novemcinctus* as stated in Kolle, Kraus, and Uhlenhuth's "Handbuch der Pathogenen Microorganismen." Photographs of each are given.

W. Y.

Bonacci (H.). Nouveau milieu de culture pour le *Trypanosoma cruzi* Chagas, 1909.—*Folia Biol.* Buenos Aires. 1931. May. No. 2. pp. 3–4.

MISCELLANEOUS.

Penso (Giuseppe). Sull' azione patogena della " Giardia intestinalis." [**The Pathogenic Action of** *Giardia intestinalis.*]—*Policlinico.* Sez. Prat. 1931. July 6. Vol. 38. No. 27. pp. 949–954. With 7 text figs. [13 refs.] [Inst. of Med. Parasit., Univ., Rome.]

The author is firmly convinced that Giardia is a pathogen. He divides cases into 3 types: 1. Non-intestinal, associated with anaemia and nervous disorders, regarded as of toxic origin; 2. Intestinal, with signs of entero-colitis; 3. Acute, with dysenteric symptoms. He mentions also a biliary type in which Giardia is present in the material removed by duodenal sound. Where cysts only are found in the faeces, the stool is normal in form, consistency and colour; where cystic and vegetative forms are present the stool is yellowish, pultaceous and contains an excess of mucus; where vegetative forms only are seen and these in abundance, the stool is yellowish, gelatinous, with much mucus and blood-streaked, in short dysenteric. In severe cases sections of the intestine show numerous parasites between the villi, adherent to the epithelial cells which are themselves eroded and degenerating. He did not find them penetrating the mucosa.

H. H. S.

Petrowych (A.). Beitrag zur Behandlungsmethode Lambliose-kranker. [**Treatment of Giardiasis.**]—*Deut. Med. Woch.* 1931. June 5. Vol. 57. No. 23. pp. 975–976. [16 refs.] [1st Soviet Municipal Hosp., Krasnodar.]

The author's observations lead him to the conclusion that the pathogenicity of Giardia is shown by the fact that the symptoms which troubled the patient ceased on instituting effective anti-Giardia treatment. This must be controlled by search of duodenal washings for vegetative forms of the parasite, and of the stools for the encysted forms. Duodenal lavage can disinfest only the upper part of the alimentary canal. Best results have followed intravenous injections of neo- and novo-salvarsan with periodical lavage of the duodenum with 25 per cent. mag. sulph. solution.

H. M. Hanschell.

Jonckheere (A.). A propos d'un cas de giardiase (lambliase) autochtome. [**A Case of Autochthonous Giardiasis.**]—*Bruxelles-Méd.* 1931. July 5. Vol. 11. No. 36. pp. 1064–1069. [22 refs.]

The author describes a case of autochthonous giardiasis, the first she says from Belgium. The history, which appeared to go back for 6 years, was one of diarrhoea with pain in abdomen, loss of flesh and occasional bouts of fever. The parasites were easily found in the stools and by duodenal tubage. The diagnosis was fermentative diarrhoea and giardiasis. Stovarsol was not tolerated, treparsol did little good, but when pyrethrine (chryseminc of commerce) was associated with it the flagellates disappeared, and several subsequent examinations had not discovered them [period not stated].

In 75 stool examinations of patients who have not left Belgium the author has found giardia in 8.

A. G. B.

MARMO (Achille). "Giardiasi." Primi casi accertati in Eritrea. [**Giardiasis ; First Cases recorded in Eritrea.**]—*Arch. Ital. Sci. Med. Colon.* 1931. June 1. Vol. 12. No. 6. pp. 336–371. With 20 figs. on 1 plate. [4 pages of refs.] English summary (9 lines).

The author gives details of six cases out of 26 mentioned, the ages of the patients varying between 10 months and "old age." He treats his cases with thymol and stovarsol, together with emetine if *E. histolytica* is present.

H. H. S.

PERUZZI (Mario). Sull' etiologia delle febbri enteroidi, dissenterie e diarree di Alessandria d'Egitto. [**The Aetiology of Enterica, Dysentery and Diarrhoea in Alexandria.**]—*Ann. di Med. Nav. e Colon.* 1931. Sept.–Oct. 37th Year. Vol. 2. No. 3–4. pp. 572–591. [1 ref.] [Benito Mussolini Italian Hosp., Alexandria.]

During the 8 months July 1930–February 1931, the author examined 198 specimens, serologically by agglutination and culturally from the faeces. In 86 of these he was able to identify the organism associated with the clinical condition and he concludes as follows :

Group 1. Parasitic affections 14, including Amoeba, Lamblia, Blastocystis, Schistosoma.

Group 2. Enteric and bacillary dysentery 37 : *B. typhosus, B. paratyphosus, B. dysenteriae, B. paradysenteriae.*

Group 3. The same associated with *Vibriothrix zeylanica,* 8.

Group 4. Enteric-like fevers, dysenteric entero-colitis and diarrhoea, 27 : *B. columbensis, B. morgani, B. ceylonensis, B. madampensis, B. metadysentericus, B. enteroides.*

He calls attention particularly to group 4, in that, if the examinations had been restricted to the usual enterica, dysentery and paradysentery organisms, these would have been overlooked, and also to the fact that CASTELLANI'S metadysentery bacilli are associated with chronic diarrhoea and symptoms of auto-intoxication.

H. H. S.

CASTELLANI (Aldo). **On a Common Type of Chronic Colitis which is Seldom Recognized.**—Reprinted from *Practitioner.* 1931. May. Vol. 126. pp. 537–545. [17 refs.]

In this article the author draws the attention of clinicians to the colitis which is etiologically related to the organisms he has often described as metadysentery bacilli. Three illustrative cases are given.

W. F. Harvey.

VAN HOORDE. Traitement des diarrhées par l'amiphène. [**Treatment of Diarrhoea by Amiphene.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 59–65.

Amiphene is "dioxyphenoiodo sulphonate de potasse," a powder containing 31 per cent. of iodine and soluble in water. It is given in capsule which in an alkaline medium dissolves with the liberation of iodine. It was administered in some 20 cases of Europeans at Leopoldville, with diarrhoea described as tropical or putrefactive, with good effect.

A. G. B.

STURTON (S. D.). **Oedema and Ascites in Chinese Patients. Being a Dissertation for the Degree of M.D., Cantab.**—*China Med. Jl.* 1931. July. Vol. 45. No. 7. pp. 584–625. [20 refs.]

Since 1921 the author, at a Mission Hospital of 400 beds at Hangchow, has been impressed with the large number of out-patients suffering from ascites, or oedema of the lower limbs, or both.

He divides the cases into—diseases of world-wide distribution—heart, kidney and liver disease, etc.; "tropical" diseases—beriberi, helminthiasis (ankylostomiasis, fasciolopsis infection, ascariasis); and cases without any obvious organic cause. It is of these last that the author writes in his paper. The figures for 1929 are, splenomegaly 17 outpatients and 4 inpatients, ascites 13 and 3, oedema 12 (outpatients). These are again divided into cases with and cases without splenomegaly.

Oedema or ascites with splenomegaly. In these cases there is no organic lesion other than enlarged spleen; blood and urine examination is negative, and no ova have been found in the faeces. It is noted that 60 miles to the north 7 per cent. of the population is infected with schistosomiasis, but none is found at Hangchow. Kala azar is unknown south of the Yangtse. Benign tertian malaria is common, but would not in the author's opinion account for the splenic enlargement. He finds that a heavy dose of X-rays or 5 grains of pot. iod. ter die will reduce the spleen by 25 per cent. No indication is given of the fate of these patients.

Oedema or ascites without splenomegaly. Notes are given of 19 of these cases and a table shows the principal features. All were inpatients and 18 were males. The history varied from 2 weeks to over a year. Possible diagnoses are, wet type of beriberi, epidemic dropsy, hunger oedema, residual effects of fluke disease, malarial anasarca, tissue acidosis, and these possibilities are discussed. The author rules out beriberi and hunger oedema. The signs and symptoms of this disease and of epidemic dropsy are compared in a table; they differ in most respects. Hangchow is on the north bank of the Chien Tang estuary, to the south of which lie the centres of *Fasciolopsis buskii* infestation. The oedema may persist when the ova have been banished by treatment. All patients therefore who came from the endemic areas were treated with oil of chenopodium: in no case have flukes been seen. He thinks that malaria may play a part in the aetiology and "clinical evidence points strongly to the possibility of tissue acidosis associated with debility."

A. G. B.

MITRA (Subodh). **Anaemia of Pregnancy.**—*Indian Med. Gaz.* 1931. July. Vol. 66. No. 7. pp. 363–379. With 4 graphs & 3 figs. on 1 plate. [18 refs.]

In the years 1926–30, out of 1,883 labour cases in the Women's Hospital at Calcutta, the author has had 86 cases of anaemia of pregnancy; 25 died in hospital, and the infant mortality was 52·8 per cent. The chief features of these cases are displayed in an eight-page table. The conclusions are as follows:—

"1. Although rare in Great Britain and on the Continent, anaemia of pregnancy is very common in India.

" 2. The clinical course is very rapid ; and the patient is cured or dead within 6 weeks.

" 3. The mortality, both maternal and foetal, is very high.

" 4. Definite histological changes are found in the liver pointing to a toxaemia of pregnancy. There is degeneration of cells at the centre of the hepatic lobule, and haemorrhagic areas beyond it, while the peripheral portion is healthy. These changes have been found in four consecutive cases.

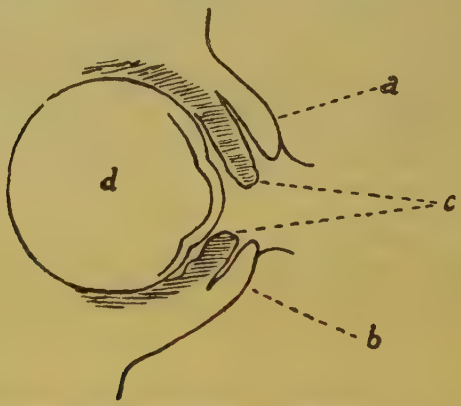
" 5. Thus from the aetiological standpoint it is considered to be a kind of toxaemia of pregnancy.

" 6. Fractional deep X-rays have been used to stimulate the reticulo-endothelial apparatus thereby increasing the immunity and the formation of all kinds of blood cells."

A. G. B.

MARMO (Achille). Forma rara di granuloma sottocongiuntivale osservata in Eritrea. [**An Unusual Form of Subconjunctival Granuloma in Eritrea.**]—*Ann. di Med. Nav. e Colon.* 1931. May–June. 37th Year. Vol. 1. No. 5/6. pp. 310–313. With 2 figs. on 1 plate. [1 ref.]

The condition here described affects individuals between 15 and 40 years of age, chiefly males. When fully developed there results a painless growth, reddish in colour, of fleshy or even cartilaginous consistence, not ulcerating, but adherent to the conjunctiva. It usually starts at the internal angle of the eye, occasionally at the external, and at first a probe can be passed between the lid externally and the ocular conjunctiva internally and the



Mesial section of the globe and eyelids. a & b=lids, c=growth, d=eyeball.
[Reproduced from *Annali di Medicina Navale e Coloniale.*]

growth ; later this cannot be done and the palpebral fissure is reduced to a " canal " of 3–4 mm. width. At this later stage, the conjunctiva, palpebral and ocular, is firmly adherent to the new growth, which is not encapsulated. Histologically, the newly formed tissue is largely fibrous, or granulomatous with lymphoid cells invading the normal tissue, the periphery is vascular. In some there are foci of amyloid or myxomatous degeneration. No special bacteria or protozoa have been found on repeated examination. MCALL has recorded a similar condition observed by him in Central China [see this *Bulletin*, Vol. 18, p. 81].

H. H. S.

i. Venkataraman (K. V.). **(A) Report on "Ubbumariyayee" in Pennadam.**—*Rep. King Inst. of Preventive Med., Guindy for Half-Year 1st Apr. to 30th Sept. 1930.* Appendix II, May & June 1930. pp. 27–29.

ii. ——. **(B) Report on Sprue in Golden Rock.**—*Ibid.* pp. 29–30.

iii. Theodore (J. H.). **(C) Report on the Existence of Bowel Complaints in Golden Rock.**—*Ibid.* pp. 30–31.

i. "Ubbumariyayee" is the local name of a disease occurring in the village of Pennadam, on the southern border of the South Arcot district, Madras, to which the attention of the Health Officer was called in March 1930 by the report of a number of deaths. He visited Pennadam and found 2 patients confined to bed, 3 others too weak to get about, and at neighbouring villages 6 more together with 60 others who had nearly recovered from the disease, and many who were perfectly well, but gave a history of having been attacked. There had been 17 deaths. Twenty cases were investigated and the following is a summary of the main features of the condition.

At the onset the chief symptoms were flatulent distension with diarrhoea, 5 or 6 motions in the day, not copious and rarely watery, and not confined to the early hours; this abated in 2–20 days to recur after varying intervals, during which there were anorexia and weakness. Many complained of soreness of the mouth, particularly painful on taking spicy food, and some showed a red tongue with inflamed edge. Fatal cases developed oedema of legs and ascites and a terminal dysentery. There was no fever at any time. Physical examination revealed little beyond anaemia, more or less severe, and slight wasting. Four of the bed-ridden patients had anasarca and ascites, one a little pleural effusion and two oedema of legs. Among 60 whose faeces were examined there were 45 passing hookworm ova, 6 with *E. histolytica* cysts, one with *Bact. dysenteriae* Flexner, two with *Bact. faecalis-alkaligenes*.

The combination of dyspepsia, flatulence, diarrhoea, anaemia and soreness of mouth suggested sprue, but the general appearance did not bear this out; the emaciation was not marked, the stools were neither frothy nor pale, and the affection of a large number almost simultaneously is against this diagnosis. Other possibilities are epidemic dropsy and beriberi. Some dietetic deficiency is probable since rice is the staple article of diet; it is mostly stored in front of the houses in stacks made of bundles of straw and exposed to rain. It is usually eaten after "parboiling." Lt.-Colonel King, Director of the King Institute, Guindy, proposes to send an investigation unit to Pennadam after the rains to observe the condition further.

ii. A condition closely resembling Ubbumariyayee was studied by Dr. Venkataraman among railway employees at the Golden Rock Colony, Trichinopoly, in July 1930. He saw 16 patients and the clinical state, though not typical of sprue, he considered resembled this rather than Ubbumariyayee. There was more chronic diarrhoea, with copious, frothy, foul, fermenting stools, progressive emaciation, severe anaemia and a raw glazed tongue. He was informed that "the response of these cases to treatment with calcium lactate and parathyroid extract and liver extract had been most encouraging." Various bacilli were isolated from the stools—a non-agglutinating *Bact. dysenteriae* Flexner, *Bact. morgani*, *Bact. enteritidis*, *Bact. pseudo-carolinus*, Monilia with two exceptions of the wild yeast, non-maltose fermenting, type—all very probably secondary invaders.

iii. Dr. Theodore comments on Lt.-Colonel Acton's findings of the above and other organisms as aetiological factors in the syndrome of sprue, sprue-like diseases and chronic diarrhoea in India and proposes that a bacteriological unit be stationed at Golden Rock for a period of at least nine months to include a rainy season and cover the time when bowel complaints are at their worst.

H. H. S.

D'Hooghe. Essai sur l'étude de la fièvre paratyphoide " C ". [**Paratyphoid C Fever.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. June 31. Vol. 11. No. 2. pp. 169–188. With 6 charts.

It is very essential that the diagnosis of paratyphoid fever C should not be solely dependent on the laboratory verdict. The occurrence of sixteen cases (Katanga) has enabled the author to set out in some detail the pathology, the syndrome and the differential diagnosis of this disease. The lymphoid tissues of the small intestine seem only to be superficially affected and the spleen is only moderately enlarged. Certain differences from typhoid fever are apparent in the temperature curve, which attains 39 to 40° C. in 2 or 3 days, or even more abruptly. At its height the temperature may be septicaemic in type and defervescence may be sudden or by lysis. The stupor of typhoid fever is usually wanting. Other features, which lead to a suspicion of paratyphoid C, are meningeal symptoms and jaundice. Prognosis is rather serious and in the 16 cases here referred to there were 7 deaths. Treatment is mainly symptomatic and as a prophylactic measure the author recommends T.A.B.C. vaccine.

W. F. Harvey.

Manoussakis (E.). Traitement des troubles quiniques de nature idiosyncrasique. [**Treatment of Idiosyncrasy to Quinine.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. July 20. Year 47. 3rd Ser. No. 25. pp. 1426–1429. [1 ref.]

The author has shown that one can prevent the symptoms of idiosyncrasy to quinine by giving each dose before the previous one has been excreted [this *Bulletin*, Vol. 28, p. 64]. An indispensable condition of tolerance, he writes, is the presence of quinine in the system. He here quotes seven more cases, one in detail.

A soldier with malaria since 1925 was unable to get rid of his infection owing to quinine idiosyncrasy. The author injected 10 cgm. of quinine on September 19th, producing a scarlatiniform rash, fever, vomiting, faintness. The next day and each day till September 29 the patient took 1 gm. in three injections daily without disturbance. On October 4, after five days' interruption, injection of 25 cgm. was followed by a severe reaction whereas the two following days the same dose was well borne. The same series of events occurred after another interruption. All the patients left hospital cured of their malaria.

A. G. B.

Boyd (T. C.), Napier (L. Everard) & Roy (A. C.). **The Distribution of Antimony in the Body Organs.**—*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 285–294. [1 ref.]

The authors estimated the distribution of antimony in the tissues and organs of monkeys after the administration of Bayer 693 B (di-ethyl-amine-para-amino-phenyl stibiate) in sublethal doses; their object being to see whether the antimony is deposited or held up in any of the organs and if possible to explain the curative effect of antimony in kala azar. Six animals were employed.

The authors conclude :—

" It does not appear that any particular organ or system has any marked affinity for the antimony. The immediate distribution of antimony would appear to be entirely dependent on physical factors. As we have shown

elsewhere, the main channel of elimination of the antimony compound is through the kidneys. Forty-eight hours after the last dose of a course of injections the bulk of the remaining antimony is found in the liver where it is possibly stored prior to being excreted, but there does not appear to be any general loading of the fixed reticulo-endothelial cells of the body with antimony.

" These experiments do not lend any support to the theory that antimony acts by stimulating the function of the reticulo-endothelial cells yet they in no way disprove this theory, as the reception of a stimulus need not necessarily be accompanied by storage of the stimulating substance, in fact it is more likely that the giving of the stimulus would result in a throwing off of the stimulant ; on the other hand they lend definite support to our contention that the action of antimony is an indirect one."

A. G. B.

Basu (N. K.). **Effect of Emetine on Blood-Sugar.**—*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 121–129. With 7 graphs.

Emetine has a marked action on the liver and one of the functions of the liver being carbohydrate metabolism the author determined the amount of sugar in the blood before and after administration of emetine in rabbits and cats " practically starved," to eliminate variations due to diet. The sugar was estimated by the Folin-Wu colorimetric method.

Conclusion.

" (1) Emetine raises the blood-sugar. (2) Emetine stimulates the vagus—as shown by atropine experiments—which is the cause of the rise of the blood-sugar. (3) Emetine does not affect the secretion of the supra-renal glands. (4) Emetine does not seem to affect the glycogenolytic process in the liver or in the muscles. (5) Emetine seems to inhibit the secretion of the islets of Langerhans through the inhibitory fibres of the vagus."

A. G. B.

Levaditi (C.) & Lépine (P.). Etude de 45 éléments du point de vue de leurs propriétés curatives dans les spirilloses, la syphilis et les trypanosomiases. [**Study of 45 Elements from the Point of View of their Curative Properties in the Spirilloses, Syphilis and Trypanosomiasis.**]—*C.R. Acad. Sci.* 1931. Aug. 31. Vol. 193. No. 9. pp. 404–406. With 1 text fig. [2 refs.]

The authors give a figure in which the elements are arranged according to Mendeleeff's periodic law. Those which have been examined by them are indicated on the figure which also shows the active, the moderately active and the inactive elements. Of the 90 known elements 45 were studied. Of these, 10 are endowed with curative properties for the infections named (V, Ga, As, In, Sb, Te, Pt, Au, Hg, Bi). Usually when a derivative of a given element is so endowed, the metal itself in fine division is curative also ; exceptions are gold and gallium.

A. G. B.

Kerr (A. F. G.). **Poisoning by Pak Wan** (*Melientha suavis*) **in Siam.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 141–143. With 1 text fig.

" Pak wan " is the Siamese name for *Melientha suavis* Pierre, a small Opiliaceous tree common in dry deciduous forests. During the dry season

the tree puts out new shoots which are gathered and eaten, usually with impunity. But under conditions at present unknown they give rise to fatal poisoning. Details of a case, seen after death, are given. The symptoms, which seem to develop slowly, are giddiness and faintness, vomiting, and either collapse and death, or recovery with a sore mouth. The vomit is reported sometimes as black. The author suggests that the shoots may be at times infected with a parasite, animal or vegetable, which renders them toxic. The shoots are figured.

A. G. B.

BLACKIE (W. K.). **A Case of Carbon Tetrachloride Poisoning in Southern Rhodesia.**—*Jl. Helminthology.* 1931. July. Vol. 9. No. 3. pp. 129–132. [4 refs.]

The author notes the conditions in which fatal poisoning may follow the oral administration of carbon tetrachloride, viz. alcoholic cirrhosis, alcohol taken immediately after the drug, fat diet, presence of ascarides, deficiency in blood calcium reserve, impurities in the drug. In the present case none of these conditions was present.

An adult native from Nyasaland was admitted to the Salisbury Hospital for a painful swelling of the left lower limb. Hookworms being found, he was treated for them. After a supper of rice and bread and milk, at 7·0 a.m. he received 3 cc. of carbon tetrachloride in capsule, followed by mag. sulph. at 9·0. A stool containing Necators was passed. By midday he was drowsy and lethargic with vertigo ; in the evening he vomited. He lapsed into coma and died at 5.0 a.m., 22 hours after the dose. The liver was enlarged and of a pale colour. Microscopically, the lesions presented a distinct zonal distribution in regard to the liver lobule.

" At the periphery of each lobule and in close proximity to the portal tracts a number of liver cells could invariably be found showing only slight degrees of cloudy swelling. Cells situated a short distance in from the periphery and cells of the mid-zonal area showed much vacuolation of their cytoplasm and an indeterminate cell outline while the central cells were so extensively damaged and autolysed as to give the centre of the lobule a loose reticular appearance. In those areas characterised by extensive damage to the parenchyma, the liver sinusoids were intensely congested and showed a tendency to bulge outwards and replace the damaged liver cells thus giving a haemorrhagic appearance to parts of the section."

There were also lesions of the kidneys and lungs. Two other native received a similar dose under similar conditions on the same day without harm.

A. G. B.

SERRA (Américo). **Balantidial Dysentery in Child. Death following Rectal Administration of Oil of Chenopodium. Case Report.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. June. Vol. 6. No. 4. pp. 443–444. [1 ref.] [Ponce Biol. Lab., Ponce, Porto Rico.]

In over 5,000 stool examinations made at the Ponce Laboratory, Porto Rico, *Bal. coli* was seen in only 4 cases and in only one were there symptoms of dysentery.

The case was that of a white female child aet. 6 years of 40 lbs. weight with pallor, weakness, breathlessness and bloody diarrhoea of 6–7 months' duration. Large numbers of *Bal. coli* in stools. Bismuth subcarbonate, emetine hydrochloride and dihydranol having proved ineffective, oil of

chenopodium was administered by CORT's method [this *Bulletin*, Vol. 26, p. 164]. Four grams in 25 cc. olive oil were given rectally. In less than an hour there was vomiting, then dizziness, stertor, convulsions, laboured respiration and, after less than 6 hours, death from respiratory failure. No autopsy.

[One of CORT's 12 cases developed vomiting, dizziness and collapse owing, it was thought, to an overdose.]

A. G. B.

i. PASRICHA (C. L.), DE MONTE (A. J.) & GUPTA (S. K.). **Seasonal Variations of Cholera Bacteriophage in Natural Waters and in Man, in Calcutta during the Year 1930.**—*Indian Med. Gaz.* 1931. Oct. Vol. 66. No. 10. pp. 543–546. With 2 text figs. [1 ref.]

ii. ——, —— & ——. **Seasonal Variations of Dysentery Bacteriophages in Natural Waters and in Man, in Calcutta during the Year 1930.**—*Ibid.* pp. 546–549. With 2 text figs.

iii. ——, —— & ——. **Seasonal Variations of Typhoid Bacteriophage in Natural Waters and in Man, in Calcutta during the Year 1930.**—*Ibid.* pp. 549–550. With 1 text fig. [School of Trop. Med. & Hyg., Calcutta.]

i. Bacteriophage was isolated from water according to the following technique :—

One hundred cc. test water were added to 10 cc. 10 per cent. peptone water ; incubated over night, the surface growth plated for isolation of vibrios and the peptone water culture filtered for bacteriophage. The filtrate was incubated with a young bacteriophage-free peptone water culture of a vibrio which was capable of propagating all types of phage. This culture was again filtered and the filtrate tested for phage thus : One cubic centimetre of a 4-hour old peptone water culture of a pure vibrio was added to 10 cc. of papain broth, varying amounts of the filtrate added and the emulsion immediately spread on an agar plate. Samples which showed phage were, after passage with a susceptible vibrio, tested for type.

The technique was similar for the examination of stools. The great majority of the phages were of the quick acting Asheshov-type A. An explanation is put forward for the comparative absence of types B and C in nature as being due either to their death or the want of a sufficiently delicate technique to demonstrate their presence. Thus the original filtrate of a 2nd-day cholera stool with agglutinating vibrios present gave a type A cholera phage which after passage with a susceptible vibrio furnished all three types A, B and C. The original stool however, with and without dilution in broth or tap water, failed after 10 days to furnish any but type A. Points which are brought out in the article are that : (1) " Cholera phages in Nature vary with the incidence of the disease." (2) The heavy monsoon rainfall " checks the activity of cholera." (3) " The mortality rate which is high at the beginning of the cholera season falls rapidly when cholera phages have become widely distributed in Nature." (4) Non-agglutinating vibrios in waters are more frequent at the beginning of the cholera season.

ii. This article proceeds on similar lines. " Dysentery phages can frequently be isolated from individuals not suffering from dysentery." Many of the phages isolated from natural waters and from man were of low virulence and soon died out in the original filtrates. Their virulence could be exalted to a limited extent. A few races of bacteriophage after repeated transfers on susceptible bacteria became virulent and

able to cause " a rapid, complete and permanent lysis of several strains of dysentery organisms." Secondary colonies, developed after the action of phage, were non-agglutinable by high titre sera and although fermenting the same sugars as the parent strain did so " with the production of gas."

iii. Three hundred and eighty-five samples of water and 403 individuals were examined for the presence of typhoid bacteriophage with a 12 per cent. and 10 per cent. success respectively. Four types of phage were obtained. Administration of virulent phages to 5 cases of typhoid fever was followed by improvement in two.

W. F. Harvey.

SENEVET (G.). Un test pratique en parasitologie clinique. [**A Practical Test in Clinical Parasitology.**]—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 284–286. With 1 text fig. [Pasteur Inst. of Algeria & Faculty of Med., Algiers.]

It is not uncommon for the inexperienced worker to mistake some element belonging to the food debris in a stool for a cyst or a helminthic ovum. The mistake is usually due to want of appreciation of the absolute size ot the object. The author proposes that lycopodium spores be incorporated with the test faecal matter as a routine procedure so as to provide a measure by which relative size can be immediately appreciated on microscopic examination.

W. F. Harvey.

HENNESSEY (R. S. F.). **Some Remarks on Laboratory Medicine, with Special Reference to Certain Common Investigations.**—*Kenya & East African Med. Jl.* 1931. Oct. Vol. 8. No. 7. pp. 200–207.

The author discusses procedure in the serum agglutination test, the Van den Bergh test and the examination of blood films for malarial parasites. It is, on occasion, necessary to make special test for somatic agglutinins in case the infecting organism be a non-flagellated variant or the individual have already been prophylactically inoculated. His rules for malaria are : (1) Search the thick film until a parasite is seen or for a maximum period of 15 minutes. (2) If parasites average one or more per forty fields, examine the thin film for 15 minutes. (3) If parasites do not average one per forty fields only examine the thin film for signs of blood disease.

W. F. Harvey.

FITZGIBBON (H. E.). **Native Locations in Africa.**—*Jl. Inst. Municipal & County Engineers.* 1931. June 9. Vol. 57. No. 25. pp. 1367–1372.

The author develops the argument that it is fruitless to condemn natives or any other people for filthy conditions and surroundings which it is practically beyond their power to alter. An inspection of native locations is sufficient to show that from a sanitary point of view the principal objection to be found is the neglect of the necessary public services of scavenging, latrine management, etc. The scavenging is usually neglected, and the maintenance of roads and drains altogether ignored. [The author is writing of Africa.] Rats are natural scavengers, but if the scavenging is properly done by an efficient

scavenging service the rats will go elsewhere or die out. Where good maintenance regulations (for huts) are strictly enforced, harbourage of insects will not be much of a problem. Free whitewash or colour wash would not cost Government or Local Authorities very much, and would be welcomed by the natives. It could, perhaps, be made up with some suitable non-poisonous chemical substance inimical to insect life. The author is against the standardized square concrete, corrugated-iron roofed buildings on aesthetic grounds, and because natives will never voluntarily inhabit such buildings.

Roughly finished concrete walls are no easier to cleanse than the surface of mud plaster, while the bare surface of cold stone or cement concrete condenses more moisture from the air than mud or any other plaster. The author suggests :

1. Select site, if possible on rising ground and within one mile of work. 2. Planning of site. [In the selection of a site special attention should be given to the direction of the prevailing wind in relation to anopheline breeding areas.] 3. Grading of roads, etc., and construction of roadside drains. 4. Regulations and type plans for construction and maintenance of houses (including whitewashing), yards and partition fences, and for inspection and dealing with infractions. 5. Organize and maintain sufficient services for scavenging (and conservancy if necessary) and for routine management of roads and drains. 6. Require that an impermeable layer of some suitable material be laid over the site of every building.

H. Home.

QUAIFE (W. T.). **The Brushing Method of Oiling.**—*Malayan Med. Jl.* 1931. June. Vol. 6. No. 2. pp. 62–63. With 1 text fig.

This method is a modification of oiling with a small mop which has been employed for many years.

" *Materials :* (1) a small mop of shredded coconut fibre on a light stick ; (2) a flat Chinese bamboo broom ; (3) a one gallon pail. The oil used is local Diesel fuel (French, ' Mazout '). The high larvicidal efficiency of the local Diesel fuel in the field has long been established by Hacker, Wellington, myself and doubtless many other observers."

" *The Method.* Two men are necessary. One takes the oil and the small mop, and having dipped this into the oil, sprinkles the water, walking forward smartly four paces, and then dips again. The other man lightly brushes the oil and water to and fro on to the edges. He brushes not at right angles to the edges, but at a very acute angle, and thus splashes waves of oil and water along the edges of the drain or stream. A fine mixture results and an even continuous film of oil is left on the water. For some time afterwards there is a trickle of oil back from the edges.

" In streams wider than one yard it is necessary to sprinkle both edges, but in narrower waters the centre only is sprinkled. In very narrow drains the brush is drawn vigorously along the drain once without the special brushing movement. The work is light, and the men go along rapidly.

" *Quantity used.* A film sufficiently thick on a drain half a yard wide is obtained by one dip of the mop to four paces and works out at approximately one gallon of oil to ten chains of drain (one litre to fifty metres). But one gallon to twenty chains of drain half a yard wide (one litre to one hundred metres) gives a good film which is effective as a larvicide. On one estate two men oil by this method 250 acres of flat land containing a larger number of drains than is commonly seen in an oiling area, in six hours' work. The average forty chains radius oiling area in wet weather would be oiled by four men by this method in one working day and this is better for supervision than where one oiler is employed working daily.

" *Advantages of the brushing method :* (1) Rapidity and lightness of the

work for the labourer ; (2) a cheaper oil is used ; (3) less than half the quantity of oil is used than by spraying with a pump sprayer and little more than half where a pneumatic sprayer is used—on the average, the cost of oiling is halved by this method ; (4) where transport of oil is costly, then this method should be employed.

" *Disadvantages.* The method is not suitable for widely distributed seepages such as occur in some ravines with high clay sides. Grass is not killed in the drains and on the sides by this method. But it is cheaper to scrape the grass by hand labour than to use an expensive oil to kill it."

Recent surveys of an area oiled by this method showed no anopheline larvae in the oiled places.

A. G. B.

HOLT (R. L.). **A New Mosquito Spray.**—*Milit. Surgeon.* 1931. Dec. Vol. 69. No. 6. pp. 625–627.

" Two hundred and forty grams of fresh pyrethrum powder were treated with 408 cc. of carbon disulphide for a period of two hours. At the end of this time the mixture was filtered, the filtrate of approximately 350 cc. being added to enough water-white kerosene to make one gallon of mixture. Using the same quantities, other mixtures were made using acetone and chloroform respectively as solvents."

The preparations made with carbon bisulphide and acetone were efficient but highly toxic and inflammable.

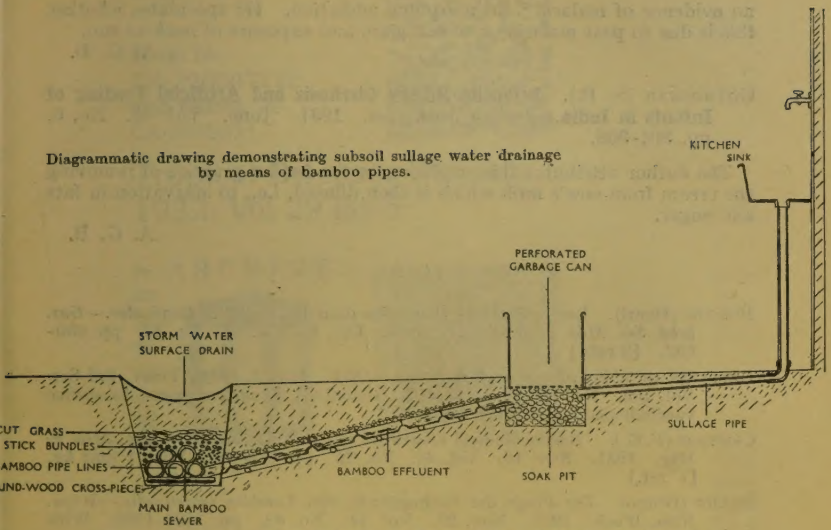
" The chloroform mixture has a very pleasant odor and shows fully as much efficiency as either of the other mixtures. There is no danger from fire. Toxicity to man and animals is absent. The final trial of this preparation was made by spraying one cubic centimeter for each thirty cubic feet of air space in wards of Sternberg General Hospital containing about one hundred thousand cubic feet. The instrument used was a paint spray gun actuated by compressed air and the amount of the spray used for wards of this size was about 350 cc. for each ward. All spraying was done near the ceilings of the wards and the gaseous mixture allowed to settle out. No attempts were made to close the wards in any manner. Ceiling fans were stopped to prevent dissipation. At the end of the spraying process a faint mist of the spray could be seen throughout the ward. Five minutes after spraying had ceased mosquito-net cages, containing a known number of the insects, were taken into the ward and placed on the floor at or about the centre. Calculations of the efficiency of the method were made at the end of thirty minutes in all three cases. It was found that an average of 90 per cent. of all mosquitoes in the cages were killed at the end of this time. The cages were then removed and kept over night to determine if any of the insects recovered. It was found that recovery did not take place. Under the same conditions it was also found that this particular spray was highly efficient in the destruction of cockroaches and flies."

The cost is about one dollar per gallon of mixture.

A. G. B.

JACK (J.). **Use of Bamboo in Subsoil Drainage.**—*Jl. Roy. San. Inst.* 1931. July. Vol. 52. No. 1. pp. 13–18. With 7 figs.

The author describes subsoil drainage in which bamboos were substituted for ordinary drainage pipes in flat and swampy land, the soil clay and extremely impermeable, in a district bordering on the Demerara River. When cut and exposed to the sun and rain bamboo rapidly cracks and decays ; if it is cut green and buried in the soil it will last for years. Green stems of 4 to 6 inches in diameter should be selected, trimmed and cut into lengths of 15 ft. approximately. By means of a series of deep notches, penetrating to one-half the



Diagrammatic drawing demonstrating subsoil sullage water drainage by means of bamboo pipes.

[Reproduced from *Les Progrès de l'Aluminium VIII*, published by Aluminium Ltd., Geneva.]

thickness of the bamboo, the woody septum which divides the hollow stem into sections is exposed, and partly removed, the rest being cut away with a chisel. The growing eye is also removed and we have then a thick, straight pipe, 15 feet long, provided at regular intervals with percolating orifices. For subsoil drainage the bamboo pipes are put end to end in the drains, with the notched side facing downwards. The pipes should not lie on the bottom of the drain, but should be raised with short pieces of hard, round wood, 1½ ins. in diameter, placed across the main axis of the drain, and at regular intervals, in between the notches.

The pipe is thus raised clear of the bottom, free access to the notches being allowed. To prevent earth being washed into the pipe the junctions between lengths of pipes should be covered with short lengths of bamboo split in half. The drains are partly filled with cinders, broken brick, etc., and finally covered with 2 to 4 in. of soil. Sullage water from individual houses is run direct into a small soak-pit, filled with broken brick or other rubble. This acts as a grease-trap and filter. It is surmounted by a garbage can, with fine perforated bottom, sunk into the ground about 6 in., and rests on the rubble. The effluent of the soak-pit is carried by a subsoil bamboo drain, which leads to the main bamboo drain which may be of five or six bamboo lines if necessary. This arrangement is well shown in the figures illustrating the text.

H. Home.

CORFIELD (C. Russell). **Pseudo-Argyll Robertson Pupils as Result of Long Residence in the Tropics.**—*Brit. Med. Jl.* 1931. July 25. p. 146.

The author records two cases of abnormally contracted pupils with sluggish reaction to light and accommodation in men who had lived ten years in the tropics and returned home after the war. W.R. was negative :

no evidence of malaria ; no morphine addiction. He speculates whether this is due to past malaria or to sun glare and exposure of neck to sun.

A. G. B.

GOTHOSKAR (S. B.). **Infantile Biliary Cirrhosis and Artificial Feeding of Infants in India.**—*Indian Med. Gaz.* 1931. June. Vol. 66. No. 6. pp. 304–306.

The author attributes this condition to the Indian practice of removing the cream from cow's milk which is then diluted, i.e., to starvation in fats and sugar.

A. G. B.

BONNIN (Henri). Les indications thermales dans les maladies tropicales.—*Gaz. hebd. Sci. Méd. de Bordeaux.* 1931. Oct. 4. Vol. 52. No. 40. pp. 630–637. [3 refs.]

BULLETIN DE L'ACADÉMIE DE MÉDECINE. 1931. Dec. 1. 95th Year. 3rd Ser. Vol. 106. No. 38. pp. 495–507.—Colonies. Fonctionnement du service vaccinal pendant l'année 1929.

CAWSTON (F. G.). Native Medical Treatment in South Africa.—*Jl. Trop. Med. & Hyg.* 1931. Nov. 16. Vol. 34. No. 22. pp. 378–380. With 1 text fig. [1 ref.]

KECHT (Bruno). Zur Frage der Pathogenität von *Lamblia intestinalis*.—*Wien. Klin. Woch.* 1931. Nov. 27. Vol. 44. No. 48. pp. 1500–1502. With 1 text fig. [2 refs.] [III. Med. Clinic, Univ., Vienna.]

SOERONO (M.). A Simple Method for staining Bloodfilms on a Large Scale.—*Meded. Dienst d. Volksgezondheid in Nederl-Indië.* 1931. Vol. 20. Pt. 2. pp. 122–123. With 2 text figs.

We regret to have to record the death on Easter Day, March 27, of Colonel J. H. TULL WALSH, I.M.S. (ret.). Colonel Tull Walsh was a Sectional Editor from 1916 to the date of his death.